

**MOODY INTERNATIONAL CERTIFICATION**



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**MSC Assessment Report for  
Osprey Trawlers North Sea ICES IVb twin rigged plaice fishery  
Client: Osprey Trawler Services Ltd  
Version: 5 Public Certification Report**

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## GLOSSARY OF ACRONYMS USED IN THE REPORT

ACOM	ICES Advisory Committee
ACFM	Advisory Committee on Fisheries Management - ICES
CEFAS	Centre for Environment, Fisheries & Aquaculture Science
CEMARE	Centre for the Economics and Management of Aquatic Resources
CFCA	Community Fisheries Control Agency
CFP	Common Fishery Policy
CPUE	Catch Per Unit Effort
CoC	Code of Conduct
DEFRA	Department for Environment, Food and Rural Affairs
ERA	European Research Area
ICES	International Council for the Exploration of the Seas. Overarching organisation Scientific
IMARES	Institute for Marine Resources & Ecosystem Studies
LNV	Dutch Ministry of Agriculture, Nature and Food Safety
MFA	Marine and Fisheries Agency
MFV	Motor fishing vessel, fishing boat
MPA	Marine Protected Area
MSC	Marine Stewardship Council
MSY	Maximum Sustainable Yield
NFFO	National Federation of Fishermen's Organisations
NSFO	North Sea Fishermen's organisation
PA	Precautionary Approach
PO	Producers Organisation
RAC	Regional Advisory Council
SMP	Square mesh panel sewn into the extension of the trawl net to allow round fish to escape
SSB	Spawning stock biomass
STECF	Scientific, Technical and Economic Committee for Fisheries, European Commission
TAC	Total Allowable Catch
TSB	Total stock biomass
UoC	Unit of certification. The unit of fishing effort that will be subject to MSC certification
VMS	Vessel Monitoring System
WWF	World Wildlife Fund

# 1 SUMMARY

## Assessment Team

The Moody Marine Assessment team consisted of:

Jason Combes Moody Marine (Lead Assessor); Richard Millner (Principle 1); Clive Fox (Principle 2); Rod Cappell (Principle 3 & assessment co-ordinator).

## Assessment timeline

The main assessment was announced 21/10/09 via the MSC website, Fishing News International and direct emails to identified stakeholders. A site visit in the Netherlands was undertaken by the team January 19<sup>th</sup>-22<sup>nd</sup>. This report was subsequently drafted and then peer reviewed in April 2010. The Public Comment draft was submitted in June 2010 with stakeholder comments received with any necessary revisions made in July & August 2010. The final determination report was submitted in August and the period to submit an intention to object closed on the 16<sup>th</sup> September 2010. No statements of intent to lodge an objection were received.

## Key strengths and weaknesses of the fishery management

A strength of the management system is that a Long Term Management Plan (LTMP) for plaice and sole in the North Sea is in place. This is proving to be successful with the plaice stock independently assessed as being at full reproductive capacity and as being harvested sustainably. The LTMP has moved from the recovery stage to ongoing management. However a weakness is that  $B_{lim}$  is used as the biomass limit reference point, not  $B_{MSY}$ . In addition the overlapping of complex effort management regulations associated with cod and plaice & sole encourages vessels to fish with a smaller mesh than operators would otherwise choose in the southern part of the North Sea, which results in greater levels of discards for plaice and non-target species. While these weaknesses are associated with the management of stocks at a European level under the Common Fisheries Policy, rather than choices by the UoC, every effort must be made to address these weaknesses.

While sufficient data exists to inform the assessment of the impacts of twin-rigging, as gear set-up differs within this metier, a detailed catch profile specific to the UoC is required. The fished areas also include proposed marine protected areas (SACs). A Code of Conduct adopted by the vessels fishing under the certificate includes a commitment to comply with any management measures developed for these Marine Protected Areas, which has been critical to this assessment.

## Scores for each Principle

MSC Principle	Fishery Performance
<b>Principle 1:</b> Sustainability of Exploited Stock	Overall : 81.0
<b>Principle 2:</b> Maintenance of Ecosystem	Overall : 80.0
<b>Principle 3:</b> Effective Management System	Overall : 85.5

## Recommendation

The fishery attained a score of 80 or more against each of the MSC Principles and did not score less than 60 against any indicators. It is therefore determined that the Osprey Trawler Services Ltd. North Sea twin rigged plaice fishery be certified according to the Marine Stewardship Council Principles and Criteria for Sustainable Fisheries.

## Conditions and timescales

Four conditions associated with six key areas of performance of the fishery are set:

### Condition 1

<b>Harvest Strategy</b>	<b>1.2.3 (information &amp; monitoring)</b>
<b>PI</b>	Relevant information is collected to support the harvest strategy
<b>SG 60</b>	<u>Some</u> relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy. Stock abundance and fishery removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.
<b>SG 80</b>	<u>Sufficient</u> relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy. Stock abundance and fishery removals are <u>regularly monitored at a level of accuracy and coverage consistent with the harvest control rule</u> , and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule. There is good information on all other fishery removals from the stock.
<b>SG 100</b>	A <u>comprehensive range</u> of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available. <u>All information</u> required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of the inherent <u>uncertainties</u> in the information [data] and the robustness of assessment and management to this uncertainty.
<b>Scoring</b>	<b>70</b>
<b>Rationale</b>	Data on plaice discards are derived from a limited programme of observer trips on Dutch, Danish, German and UK vessels for 2000-2008. The previous discard monitoring programmes have not included the vessels of the fishery under assessment. Anecdotal evidence was presented on main by-catch species and the amount of by-catch by the UoC, but limited quantitative data on discards is available. Therefore at present the requirements for “good information on all other fishery removals from the stock” (1.2.3) and “adequate information to support a <u>partial strategy</u> to manage main by-catch species” (2.2.3) are not met.
<b>Condition</b>	Produce a comprehensive catch profile for the UoC detailing quantities of all retained and discarded species.  We appreciate that there is limited capacity in terms of the number of vessels that can be included in the official discard programme. We therefore suggest that either: a. One or more Osprey Trawler Services vessels take part in the IMARES discard sampling and/or observer programmes; or b. Undertake self sampling using a protocol consistent with the IMARES discard sampling programme. The species, number and weight of all discards should be recorded in a similar format to the IMARES programme.  Note: A full species list is required – not only retained plaice and cod.  The data set of all discards derived from the above should be compiled with records of all retained species to create a comprehensive data set on total catch for presentation to the audit team. This data set should be analysed, including modelling the impact of cod catches on cod recovery.  <b>Timescale:</b> A comprehensive tabulated and analysed data set detailing the species, number and weight of all species caught by the vessels under each UoC (and whether retained or not) must be available at the first surveillance audit.

	<p>Analysis should include a simple model showing the impact of UoC total cod catches (retained and discarded) on cod recovery.</p> <p>Provision of this information is an ongoing requirement and, following review at first audit, will be sought for subsequent audits.</p>
<b>Client Action Plan</b>	<p>1.1. In 2010 the vessels of Osprey Group cannot be included in the IMARES discard monitoring programme. Osprey Group therefore will undertake its own discard sampling consistent with the IMARES programme. IMARES has sent the protocols and sample list consistent with the IMARES discard programme to Osprey Group on 25 March 2010.</p> <p>1.2. The current IMARES protocol only includes plaice, dab and cod discard monitoring.</p> <p>Therefore Osprey Group will additionally undertake a self sampling programme for all species caught.</p> <p>1.3. Osprey Group Skippers will be instructed to sample two fishing hauls (at 4pm each Tuesday and Thursday) during each fishing trip following the IMARES protocol. The number and weight of all discards (in the sample taken) will be recorded on an amended IMARES sample list.</p> <p>1.4. The skippers and crew of the Osprey Group vessels will be instructed and trained in the use of the amended IMARES sample list. At least one crew member on board of each of the Osprey Group vessels will be trained to identify all species caught to species level. To help with identification each vessel will be provided with species guides on both fish species and bottom fauna. Of each specimen in the catch that cannot be identified to species level a digital photograph will be taken to allow identification by a specialist.</p> <p>1.5. The skippers and crew of the Osprey Group vessels will be instructed and trained in the identification of Endangered, Threatened and Protected (ETP) species. All interactions with ETP species will be recorded on a special ETP interactions recording sheet.</p> <p>1.6. The collected data will be sent to IMARES on a monthly basis for analysis. The analysis will include a regular comparison of the data from Osprey vessel with vessels in the IMARES discard sampling programme.</p> <p>1.7. Osprey Group will contract IMARES (or another recognized scientific institution like ILVO) to conduct two observer trips on board of Osprey Group vessels. During these trips discards of all species (including plaice) will be recorded.</p> <p>1.8. The scientific institution contracted by Osprey Group will analyze all data collected and present the results annually in a report.</p> <p>1.9. The analysis by the scientific institution will include a simple model that shows the impact of the UoC total cod catches (retained and discarded) on cod recovery.</p> <p>1.10. At the first surveillance audit the data and analysis of the first year of recording of discard data will be presented to the assessment team. Following review of this information at the first surveillance audit, the discard recording will be continued and the results will be presented to the assessment team at the subsequent audits.</p>
<b>Consultation on condition</b>	Consultation with IMARES re. involvement with discard sampling programme and ongoing collaboration

<b>Retained non-target species</b>	<b>2.1.1</b>
<b>PI</b>	The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species.
<b>SG 60</b>	<p>Main retained species are <u>likely</u> to be within biologically based limits or if outside the limits there are <u>measures</u> in place that are <u>expected</u> to ensure that the fishery does not hinder recovery and rebuilding of the depleted species.</p> <p>If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the retained species to be outside biologically based limits or hindering recovery.</p>

<b>SG 80</b>	Main retained species are <u>highly likely</u> to be within biologically based limits, or if outside the limits there is a <u>partial strategy</u> of <u>demonstrably effective</u> management measures in place such that the fishery does not hinder recovery and rebuilding.
<b>SG 100</b>	There is a <u>high degree of certainty</u> that retained species are within biologically based limits. Target reference points are defined and retained species are at or fluctuating around their target reference points
<b>Scoring</b>	75
<b>Rationale</b>	Although by the MSC definition, cod is not a main retained species by the UoC, the status of the cod stock in the North Sea is of particular concern and it is listed under OSPAR (see separate comments under the ETP sections of this report). For this reason the catches of cod by the UoC, even though small, need to receive some attention. Currently the scientific advice is that although SSB has increased from the low of 2006, it is still below $B_{lim}$ (ICES WG, 2009). Cod re-building is currently managed under the European Council cod management plan. This plan includes a target fishing mortality of 0.4 (EC 1342/2008) and the 2009 cod quota was set at 28,798 tonnes by the EU Commission. In 2009 the UoC landings data provided to the assessment team indicate landings of around 9 tonnes of cod per vessel against this quota. The UoC voluntarily take measures such as use of lowered headline to reduce the amount of cod caught and fish in an area where cod are currently not common. Data from comparable fisheries suggest cod discard rates in twin-rig trawl fisheries are low although this may vary with the area fished. On this basis it is unlikely that the levels of cod landed by the UoC will have a significantly negative impact on cod rebuilding and the UoC is taking measures that are expected to ensure that the fishery does not hinder recovery and rebuilding of this depleted species. Condition 2 will also address this issue.
<b>Condition</b>	See condition 1 above
<b>Client Action Plan</b>	See condition 1 above
<b>Consultation on condition</b>	See condition 1 above

<b>Discarded species</b>	<b>2.2.3 Information/monitoring</b>
<b>PI</b>	Information on the nature and amount of by-catch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage by-catch.
<b>SG 60</b>	<u>Qualitative information</u> is available on the amount of main by-catch species affected by the fishery. Information is <u>adequate</u> to <u>broadly understand</u> outcome status with respect to biologically based limits. Information is adequate to support <u>measures</u> to manage by-catch.
<b>SG 80</b>	<u>Qualitative information and some quantitative information are</u> available on the amount of main by-catch species affected by the fishery. Information is sufficient to estimate outcome status with respect to biologically based limits. Information is adequate to support a <u>partial strategy</u> to manage main by-catch species. Sufficient data continue to be collected to detect any increase in risk to main by-catch species (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy).
<b>SG 100</b>	<u>Accurate and verifiable information</u> is available on the amount of all by-catch and the consequences for the status of affected populations. Information is <u>sufficient</u> to quantitatively estimate outcome status with respect to biologically based limits with a <u>high degree of certainty</u> . Information is adequate to support a <u>comprehensive strategy</u> to manage by-catch, and evaluate with a high degree of certainty whether a strategy is achieving its objective. Monitoring of by-catch data is conducted in sufficient detail to assess ongoing



	mortalities to all by-catch species.
<b>Scoring</b>	<b>70</b>
<b>Rationale</b>	Anecdotal evidence was presented on main by-catch species and the amount of by-catch by the UoC to the audit team. Some literature data exist to support this. The IMARES discard sampling program is in place and vessels from the UoC have taken part in it. <u>Qualitative information and some quantitative information are available</u> on the amount of main by-catch species affected by the fishery..Information is adequate to broadly understand outcome status with respect to biologically based limits and the information is adequate to support measures to manage by-catch but the amount and coverage of the data need to be improved. Because the IMARES discard program is on-going this goes some way towards the 80 score criteria – ‘Sufficient data continue to be collected to detect any increase in risk to main by-catch species (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy)’.
<b>Condition</b>	See condition 1 above
<b>Client Action Plan</b>	See condition 1 above
<b>Consultation on condition</b>	See condition 1 above

## Condition 2

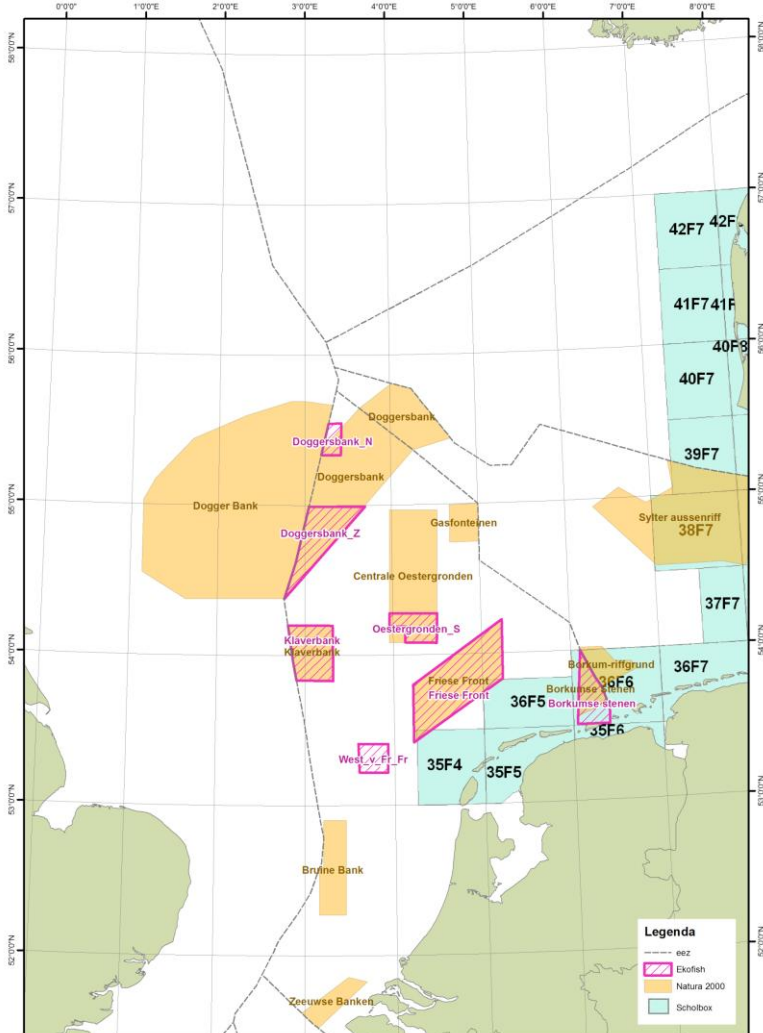
<b>ETP species</b>	<b>2.3.3 (information / monitoring)</b>
<b>PI</b>	Relevant information is collected to support the management of fishery impacts on ETP species, including: - information for the development of the management strategy; - information to assess the effectiveness of the management strategy; and - information to determine the outcome status of ETP species
<b>SG 60</b>	Information is <u>adequate</u> to <u>broadly understand</u> the impact of the fishery on ETP species. Information is adequate to support <u>measures</u> to manage the impacts on ETP species <u>Information</u> is sufficient to <u>qualitatively</u> estimate the fishery related mortality of ETP species.
<b>SG 80</b>	Information is <u>sufficient</u> to determine whether the fishery may be a threat to protection and recovery of the ETP species, and if so, to measure trends and support a <u>full strategy</u> to manage impacts. <u>Sufficient data</u> are available to allow fishery related mortality and the impact of fishing to be <u>quantitatively</u> estimated for ETP species.
<b>SG 100</b>	Information is <u>sufficient</u> to <u>quantitatively</u> estimate outcome status with a high degree of certainty. Information is adequate to support a <u>comprehensive strategy</u> to manage impacts, minimize mortality and injury of ETP species, and evaluate with a high degree of certainty whether a strategy is achieving its objectives. <u>Accurate and verifiable information</u> is available on the magnitude of all impacts, mortalities and injuries and the consequences for the status of ETP species
<b>Scoring</b>	<b>65</b>
<b>Rationale</b>	Information is adequate to broadly understand the impact of the fishery on ETP species – possible interactions have been identified.  Information is adequate to support measures to manage the impacts on ETP species – information is adequate but could be improved.  Data on catches of rays by species needs to be collected.
<b>Condition</b>	Review discard & catch records (produced under condition 1) against list of possible ETP species to enable a sufficiently high degree of confidence in the lack of ETP/fishery interactions.

	<p>If any interactions are identified, the effects of these interactions on the population of the ETP species should be evaluated against available population estimates. If significant impacts are identified, then a management plan should be drawn up to reduce the impact of the fishery on the ETP species of concern and continued monitoring put in place to ensure that the approach is working. Evidence of effective remedial action must be presented to the audit teams.</p> <p>Evidence must be provided that vessels are complying with all EU or national strategies in relation to ETP species, including logbook submissions showing appropriate recording of sharks and ray catches and plots to show compliance with spatial management.</p> <p><b>Timescale:</b> Provision of information by first surveillance audit and ongoing thereafter.</p>
<b>Client Action Plan</b>	<p>2.1. The skippers and crew of the Osprey Group vessels will be trained in the identification and handling of Endangered, Threatened and Protected (ETP) species.</p> <p>2.2. A protocol for the handling of ETP species will be developed and included in the Code of Conduct.</p> <p>2.3. A manual (list of species and identification tools ) will be developed and kept on board of each Osprey Group vessel.</p> <p>2.4. All interactions with ETP species will be recorded on a special ETP interactions recording sheet.</p> <p>2.5. Where significant interactions with an ETP species are identified the management of the Osprey Group will take appropriate actions to reduce or avoid these interactions. Measures will be implemented through the Code of Conduct.</p> <p>2.6. A digital photograph of each unidentified ETP species caught will be taken and stored in a computer file.</p> <p>2.7. At the yearly surveillance audits the records of interactions with ETP species and the management responses will be presented to the assessment team.</p>
<b>Consultation condition</b>	All actions to be undertaken by client therefore no further consultation required.

### Condition 3

ETP species	2.3.3 (information / monitoring)
<b>PI</b>	<p>Relevant information is collected to support the management of fishery impacts on ETP species, including:</p> <ul style="list-style-type: none"> <li>- information for the development of the management strategy;</li> <li>- information to assess the effectiveness of the management strategy; and</li> <li>- information to determine the outcome status of ETP species</li> </ul>
<b>SG 60</b>	<p>Information is <u>adequate</u> to <u>broadly understand</u> the impact of the fishery on ETP species.</p> <p>Information is adequate to support <u>measures</u> to manage the impacts on ETP species</p> <p><u>Information</u> is sufficient to <u>qualitatively</u> estimate the fishery related mortality of ETP species.</p>
<b>SG 80</b>	<p>Information is <u>sufficient</u> to determine whether the fishery may be a threat to protection and recovery of the ETP species, and if so, to measure trends and support a <u>full strategy</u> to manage impacts.</p> <p><u>Sufficient data</u> are available to allow fishery related mortality and the impact of fishing to be <u>quantitatively</u> estimated for ETP species.</p>
<b>SG 100</b>	<p>Information is <u>sufficient</u> to <u>quantitatively</u> estimate outcome status with a high degree of certainty.</p> <p>Information is adequate to support a <u>comprehensive strategy</u> to manage impacts, minimize mortality and injury of ETP species, and evaluate with a high degree of</p>

	<p>certainty whether a strategy is achieving its objectives.</p> <p><u>Accurate and verifiable information</u> is available on the magnitude of all impacts, mortalities and injuries and the consequences for the status of ETP species</p>
<b>Scoring</b>	<b>65</b>
<b>Rationale</b>	<p>It is likely that impacts of twin-rig otter trawls used by the UoC on <i>Arctica islandica</i> will be less than for heavier beam trawls but these data do need to be improved.</p> <p>The fished areas do overlap with proposed marine SAC areas, including Dogger Bank. This activity should be taken into account as the Dutch government develops the Natura2000 management plan for this area. The UoC code of conduct states that it will abide by any spatial restrictions emerging from this management.</p>
<b>Condition</b>	<p>If the vessels participating in this fishery continue to fish in the proposed marine SAC areas they should contribute to the formation of an appropriate management plan by providing detailed information on the spatial and temporal extent of gear interactions in these areas.</p> <p>To identify any interactions with especially sensitive habitats an overlay map should be produced showing fishing tracks of all vessels in the UoC <u>and</u> the seabed habitat as well as the extent of proposed SACs.</p> <p>If significant interactions are identified, then a management plan should be drawn up to reduce the impact of the fishery on the sensitive habitats and continued monitoring put in place to ensure that the approach is working. Evidence of effective remedial action must be presented to the audit teams.</p> <p>The fishery should co-operate with the development of habitat management plans by relevant statutory agencies through the provision of VMS, catch data along with any relevant anecdotal evidence.</p> <p><b>Timescale:</b> By first surveillance audit and ongoing thereafter.</p>
<b>Client Action Plan</b>	<p>3.1. Osprey Group will contract a scientific institution or specialist to produce an overlay map with lesser and more sensitive habitats (sediment types), the spatial distribution of the UoC fishing activities (Fishing tracks, GPS and VMS data) and the extend of proposed Natura 2000 SACs, After review during the first surveillance visit an updated overlay map will we be presented to the audit team at subsequent surveillance visits,.</p> <p>3.2. Until the moment that management plans for the proposed Natura 2000 SACs are implemented Osprey Group will avoid fishing in the areas that are marked on the attached map. (These are the same areas that are currently avoided by of the Ekofish North Sea (ICES IVb) twin rigged otter trawl plaice fishery.)</p> <p>3.3. The overlay map will be updated at a regular basis, When evaluation of the data that are integrated in the overlay map show significant interactions of the UoC fishery with especially sensitive habitats the management of the Osprey Group will take appropriate management action in order to avoid fishing in areas with these habitats. Measures will be implemented through the Code of Conduct and communicated to the audit team at each surveillance vitit.</p> <p>3.4. Osprey Group will liaise with their fishing industry representatives and government agencies to cooperate with the development of management plans for fishery in Natura 2000 SACs. Osprey Group will provide these fishing industry representatives and other relevant statutory agencies with detailed (VMS/GPS) information of on the spatial and temperal extent of their fishing activities (in proposed Natura 2000 SAC areas).</p>

	 <p>Map 1. Areas that will be avoided by the Osprey Group. (cross-hatched pink Ekofish areas)</p>
<b>Consultation condition</b>	on All required actions are for the client, who has been in ongoing consultation with WWF and Nordzee Foundation on spatial management

#### Condition 4

<b>Governance and policy</b>	<b>3.1.4 Incentives for sustainable fishing</b>
<b>PI</b>	The management system provides economic and social incentives for sustainable fishing and does not operate with subsidies that contribute to unsustainable fishing.
<b>SG 60</b>	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2.
<b>SG 80</b>	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and seeks to ensure that perverse incentives do not arise.
<b>SG 100</b>	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and <u>explicitly considers</u> incentives in a <u>regular review</u> of management policy or procedures to ensure that they do not contribute to unsustainable fishing practices.

<b>Scoring</b>	<b>75</b>
<b>Rationale</b>	<p>A ‘perverse incentive’ has arisen in overlapping effort management measures under the cod recovery plan and the North Sea flatfish LTMP. As days at sea are allocated to particular gear sizes, vessels in the UoC are encouraged to fish with a smaller mesh than they would choose to fish with. The result is a greater proportion of discards of target and non-target species than would otherwise be the case.</p> <p>It is recognised that this situation is the result of an EU-level management regime, which the UoC must abide by. Effort management measures are revised on an annual basis. The fishery should, however, provide information to the relevant management authorities (including the catch profiling data proposed under conditions 2 and 3) to inform appropriate regulatory revision that removes the negative incentive.</p> <p>If the negative incentive is not removed by the proposed timescale, an alternative approach is required to deliver the same effect, namely a reduction in discards. This may be through alternative fishing practices such as changes to gear set up, location or timing, if those changes are permitted within the relevant regulations, the UoC and the Code of Conduct.</p>
<b>Condition</b>	<p>Provide evidence that data and information to encourage management revisions were provided to the relevant authorities.</p> <p>Provide evidence of reduced levels of discarding through either removal of the negative incentive (enabling larger mesh sizes to be operated full time) or through alternative actions.</p> <p><b>Timescale:</b> By first surveillance audit: provision of data and information encouraging appropriate management revisions. By third surveillance audit: evidence of reduced discarding levels across the fishery to levels equivalent to 110mm+ mesh sizes.</p>
<b>Client Action Plan</b>	<p>4.1. Osprey Group will undertake its own discard sampling monitoring as described in 1.1 – 1.9.</p> <p>4.2. Osprey Group will have the discard data analyzed by a qualified scientist (see 1.8.).</p> <p>4.3. The analysis will include an analysis (comparison) of the levels of discarding with 95-110 mm cod end and 110-130mm cod end.</p> <p>4.4. The Osprey group will provide the relevant authorities with data and information in order to encourage management revisions) to remove the negative incentive (smaller mesh sizes resulting in more days at sea).</p> <p>4.5. Osprey Group will provide the audit team with evidence of the actions taken to encourage the relevant authorities to remove the negative incentive at the first surveillance visit.</p> <p>4.6. In case the negative incentive to use 95-110mm mesh size is not removed before the first surveillance audit the management of Osprey Group will implement alternative measures to reduce discard levels to 110+mm mesh size or better. These measures can include the avoidance of areas with higher discard percentages and alternative gear set up.</p> <p>4.7. The Osprey Group will provide the audit team with evidence of the reduction of discard levels at the third surveillance visit,</p>
<b>Consultation condition</b>	<p><b>on</b></p> <p>All required actions are for the client, who is involved with ongoing consultation with LNV, Lowestoft &amp; Urk POs, Productshap Vis and North Sea RAC on this matter.</p>

The Assessment Team also make the following recommendation:

**Recommendation 1: Clarification on reference points**

As outlined in section 5.3:

There is a discrepancy between the ICES/ACOM advice which implies an  $F_{max}$  of 0.17 and the EU and STECF advice for long term management which specifies an  $F=0.3$  to achieve MSY. The value of 0.3 was determined by the ICES *ad hoc* Group on Long Term Management Advice (AGLTA) and was adopted by the EU in its multi-annual plan for plaice and sole (Council Regulation (EC) No 676/2007). The plan specifies that  $F_{0.3}$  is consistent with exploitation of stocks of plaice “on the basis of maximum sustainable yield”. The use of a very low  $F_{max}$  value such as 0.17 would result in an equilibrium stock in excess of 1 million tonnes. This is more than twice the size of the largest stock observed in the historical time series back to 1957. The assessors considered that the  $F_{0.3}$  specified by AGLTA and adopted by the EU was an appropriate candidate for MSY for this review.

The Assessment Team recognises the detailed consideration given by STECF to inform the long term management plan establishing  $F=0.3$  to achieve MSY. However the situation is confused at present with additional or alternative reference points reported in annual ICES advice. We appreciate this is outside the control of the UoC. However for the purposes of ongoing management planning and to ensure continued compliance with MSC criteria, we suggest that the client seeks further clarification via its representative bodies, including at North Sea RAC level.

**Client Action Plan**

- 5.1. Osprey Group will liaise with its fishing industry representatives and discuss the fact that the current management plan for plaice and sole is using  $F=0.30$  whereas in Ices advice  $F=0.17$  is mentioned as the reference point for reaching MSY.
- 5.2. Industry representatives will be asked to seek clarification for this discrepancy through North Sea RAC.
- 5.3. Osprey Group will provide the audit team of evidence of actions taken in this matter at the first surveillance audit.

## 2 INTRODUCTION

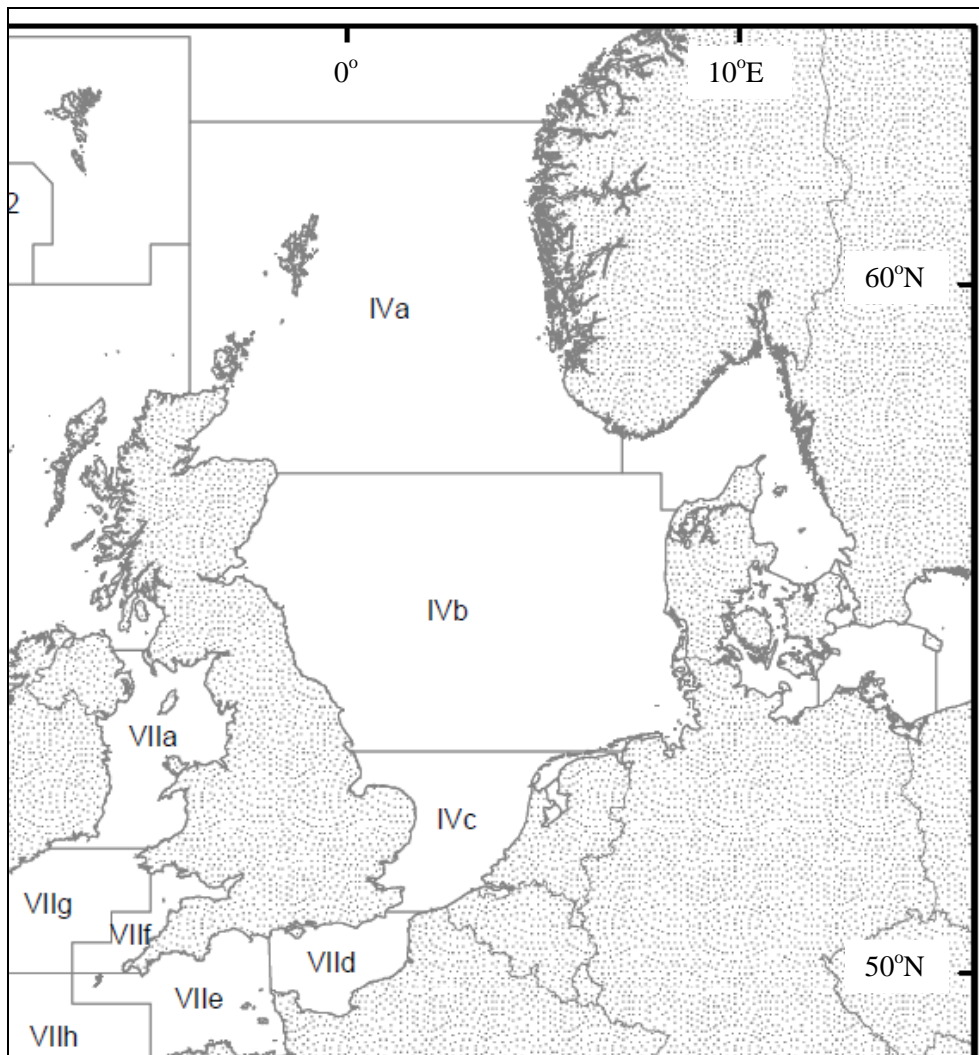
This report sets out the results of the assessment of the Osprey Trawlers North Sea Twin-rigged Plaice Fishery against the Marine Stewardship Council (MSC) Principles and Criteria for Sustainable Fishing.

### 2.1 The fishery proposed for certification

The MSC Guidelines to Certifiers specify that the unit of certification is "The fishery or fish stock (=biologically distinct unit) combined with the fishing method/gear and practice (=vessel(s) pursuing the fish of that stock) and management framework." The two fisheries proposed for certification are therefore defined as:

<b>Species:</b>	Plaice ( <i>Pleuronectes platessa</i> ). North Sea stock
<b>Geographical Area:</b>	<b>ICES IVb: Central North Sea territorial waters between UK, the Netherlands and Denmark, excluding the Norwegian sector (see Figure 1)</b>
<b>Method of Capture:</b>	<p>To comply with effort management measures under the cod recovery plan vessels in the UoC operate different cod-end mesh sizes depending on the location fished; 95-100 mm in the designated flatfish area (south of 55°/56°N), and 110 – 130 mm to the north of this.</p> <p>The UoC is therefore a demersal otter trawl operating cod-end mesh sizes of 95-130 mm that are rigged as follows:</p> <ul style="list-style-type: none"><li>• Twin rigged</li><li>• 220m wire sweeps with 70mm rubbers and every 50m a 200mm rubber</li><li>• The fishing line (foot rope) has large diameter rubbers increasing to a maximum diameter of 150mm</li><li>• A maximum of 4 tickler chains with up to 13mm diameter links</li><li>• 120mm square meshed panel SMP (knotless mesh) positioned in the top panel of the extension 3m in front of the choker of the cod end. Panel is at least 3m long.</li><li>• Double-twined cod ends</li><li>• Low headline height 1.5 – 2m</li><li>• No cod-end chafers</li></ul>
<b>Management System:</b>	<p>EU, National management measures Dutch, Danish and UK, Lowestoft PO, Osprey Trawler internal management of the UoC.</p> <p>Season is from 01 April until 15 November with no weekend fishing</p>
<b>Client Group:</b>	<p>Osprey Trawler Services Ltd, Peterhead</p> <p>Osprey Trawlers Services Ltd are the certificate holders; only vessels recognised within the group, and abiding by any controls applied to this Unit of Certification, are eligible to land MSC certified fish under this certificate. Any changes in the size of the group will be evaluated during ongoing surveillance audits.</p> <p>During the fishery assessment the Osprey Trawlers Services Ltd group included:</p> <ol style="list-style-type: none"><li>1. E104 Ansgar 36.6m Flag vessel from England</li><li>2. H357 Good Hope 32.9m Flag vessel from England</li><li>3. PW447 Louwe Senior 36.6m Flag vessel from England</li></ol>

#### 4. H426 Neeltje 28.8m Flag vessel from England



**Figure 1 ICES Divisions of The North Sea**

Note: The UoC fishes within the Central North Sea (Division IVb)

## 2.2 Report Structure and Assessment Process

The aims of the assessment are to determine the degree of compliance of the fishery with the MSC Principles and Criteria for Sustainable Fishing, as set out in Section 8.

This report sets out:

- the background to the fishery under assessment and the context within which it operates in relation to the other areas where the target species is fished
- the qualifications and experience of the team undertaking the assessment
- the standard used (MSC Principles and Criteria)
- stakeholder consultation carried out. Stakeholders include all those parties with an interest in the management of the fishery and include fishers, management bodies, scientists and environmental Non-Governmental Organisations (ENGO's)
- the methodology used to assess ('score') the fishery against the MSC Standard.



- a scoring table with the Scoring Indicators adopted by the assessment team and Scoring Guidelines which aid the assessment team in allocating scores to the fishery. The commentary in this table then sets out the position of the fishery in relation to these Scoring Indicators.

The intention of the earlier sections of the report is to provide the reader with background information to interpret the scoring commentary in context.

Finally, as a result of the scoring, the Certification Recommendation of the assessment team is presented, together with any conditions attached to certification.

In draft form, this report is subject to critical review by appropriate, independent, scientists ('peer review'). The comments of these scientists are appended to this report. Responses are given in the peer review texts and, where amendments are made to the report on the basis of peer review comments; these are also noted in the peer review text. Following peer review, the report is then released for public scrutiny on the MSC website.

The report, containing the recommendation of the assessment team, any further stakeholder comments and the peer review comments is then considered by the Moody Marine Governing Board (a body independent of the assessment team). The Governing Board then make the final certification determination on behalf of Moody Marine Ltd.

It should be noted that, in response to comments by peer reviewers, stakeholders and the Moody Marine Governing Board, some points of clarification may be added to the final report.

Finally, the complete report, containing the Moody Marine Ltd Determination and all amendments, will be released for further stakeholder scrutiny.

### 2.3 Stakeholder meetings attended

Information used in the main assessment has been obtained from interviews and correspondence with stakeholders in this fishery, notably:

Interview	Date	Name	Position and Organisation
19.01.10		Cornelius de Boer	Advisor/Skipper OSPREY Trawlers Ltd
		Hendrik de Boer	Owner/Skipper OSPREY Trawlers Ltd
		Andries de Boer	Owner/Skipper OSPREY Trawlers Ltd
		Bert Keus	Fisheries consultant Agonus Fisheries Consultants
		Willem de Boer	Director OSPREY Trawlers Ltd
20.01.10		Edwin van Helmond	Fisheries Scientist IMARES
		Paula den Hartog	National Policy Productschap Vis
		Pim Visser	Chief Executive Vis Ned
		Willem de Boer	Board member National Federation of Fishermen

21.01.10	Henk Heessen - he -	Head of biology section IMARES
	Jan Jaap Poos	ICES WGNSSK representative IMARES

**Email & telephone correspondence**

Emilie Hugenholtz	Marine Advisor WWF Netherlands
Hugh Simms	Chief Executive Lowestoft PO
Henk Offringa	Fisheries Policy Ministry of Fisheries (LNV)

**2.4 Other information sources**

Published information and unpublished reports used during the assessment are listed in section 3 below.

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## 4 BACKGROUND TO THE FISHERY

### 4.1 Introduction

This section describes the fishery in terms of the biology, history, the vessels operating within it and the gear they use.

It should be noted that another fishery, Ekofish Group, that also targets plaice in the North Sea using twin-rigged trawlers was MSC-certified in 2009. In accordance with MSC guidance on harmonisation, the Ekofish assessment documents were reviewed and taken into account when undertaking this assessment.

### 4.2 Biology of the Target Species

Plaice is a demersal species generally living on sandy substrates but may also be found on mud and gravel. The species is easily identified throughout its life history. As juveniles and adults, plaice have a striking appearance and can be readily distinguished from other flatfish species by their general colour and markings (Plate 1). The eyed, right hand, side is a warm greenish brown with bright red to orange spots on it and the underside is a pearly white. This coloration varies with the substrate into which it very lightly merges (Wheeler, 1969).



**Plate 1 Plaice *Pleuronectes platessa***

Plaice is a shallow water species found from the near coast as juveniles down to around 150 metres in northern waters. In the North Sea it is generally found in depths less than 100 metres. The species is widely distributed on the continental shelf from the Bay of Biscay in the south through the English Channel, North Sea and Irish Sea to the Baltic, Iceland, the Norwegian coast and Barents Sea in the north. The North Sea stock comprises a complex of small sub-populations with some mixing between other populations in the eastern English Channel and in the Skagerrak and Kattegat. Sub-populations in the North Sea have a strong homing behaviour to specific spawning grounds (De Veen, 1978; Rijnsdorp and Pastoors, 1995; Hunter et al., 2003; 2004).

The biology of plaice has been extensively studied for over one hundred years and there is a considerable fund of knowledge about all aspects of its life history (Gibson, 2005). The spawning behaviour, location of spawning and the nursery grounds are all well described throughout the species range (Masterman, 1911; Simpson, 1959; Rogers et al., 1998; Fox et al., 2005; Taylor et al., 2007). Fecundity varies from around 30,000 eggs per female at first maturity to over 300,000 eggs depending on age. A 35cm female produces between 60,000 – 100,000 eggs per year or about 265 eggs per gram body weight. Fecundity has been shown to change noticeably over time (van Damme et al., 2008) possibly in relation to changes in stock abundance (Rijnsdorp, 1991). Male fish mature at around 2 to 3 years old whilst female fish mature a year or two later. In recent years there has been a change, with

maturity occurring at younger ages and smaller sizes than in the past. This is thought to be partially a fisheries induced genetic change caused by fish which are genetically programmed to mature later at a larger size being caught before they have the opportunity to reproduce and pass on their genes (Grift et al., 2007).

Spawning and nursery areas in the North Sea are particularly well described and have changed little since studies began (Masterman, 1911; Simpson, 1959; Harding et al., 1978; Fox et al., 2005; Taylor et al., 2007). The principal spawning areas are in the eastern English Channel and the southern Bight of the North Sea. Although plaice eggs can be found in most shallow areas of the North Sea, they are at lower concentrations as one moves north (Fox et al., 2005). Prior to spawning there is some movement of fish between the southern North Sea and eastern Channel. Spawning begins in December in the southern North Sea and English Channel and continues through to March and April further north. The eggs are planktonic, around 2mm in diameter, and are easily distinguished, due to their large size, from other eggs present in the plankton at the same time. The larvae are also easily distinguished from other fish larvae by their general shape, size and pigmentation (Nichols, 1971; Russell, 1976). Larvae hatch in about three weeks and begin feeding almost immediately on phytoplankton, *Oikopleura* spp, *Fritillaria* spp, copepod nauplii and other invertebrates (Last, 1978, 1980; Ryland, 1964). During the planktonic phase, which lasts two to three months, the eggs and larvae are subjected to the residual drift which, in the southern North Sea, transports them to the shallow nursery areas along the continental coast and into the Wadden Sea, German and Danish Bights and east coast of the UK. During the larval drift period both eggs and larvae suffer high rates of mortality, estimated at around 80% per month (Bannister et al., 1973), but the precise causes of that mortality are not well understood. Starvation of early larvae has been studied (Shelbourne, 1957) but predation is likely to be the most important factor (Bunn et al., 2000; Daan et al., 1985; van der Veer, 1985). Plaice recruitment to the stock is mainly determined during the egg and larval phase and is driven by environmental factors such as sea temperature, predation, and drift of larvae to suitable nursery areas. In the final phase of planktonic development the larvae metamorphose into flatfish with the migration of the left eye onto the right side and the development of dark pigmentation on the eyed side. They then spend their first year in the shallow coastal areas followed by a gradual offshore migration, into deeper water with age (Gibson et al., 2002).

Although the Wadden Sea is especially important as a nursery area (Kuipers, 1977; Zijlstra, 1972), settling plaice can be found on most sandy and sandy/muddy beaches around the North Sea coastline (Harlay et al., 2001; Rauck, 1974; Rogers et al., 1998) including the Thames estuary and the Wash. The nursery areas on the eastern side of the North Sea contribute most of the total recruitment (ICES, 2009a). At the time of settlement the small plaice are subjected to predation, mainly by the brown shrimp, *Crangon crangon* (van der Veer & Bergman, 1987). Overall, post settlement mortality during the first year of life, the '0' group phase has been estimated at about 40% per month (Bannister et al., 1973) and acts as a dampening mechanism so that variability in survivor numbers at the end of the nursery ground phase is reduced compared to the variability in numbers settling (Beverton & Iles, 1992).

The diet of post-settlement plaice is well known being dominated by polychaetes, crustaceans and molluscs (Amara et al., 2001; Thijssen et al., 1974). Post-settlement plaice may also 'crop' bivalve siphons without killing the prey (de Vlas, 1979; Lockwood, 1980). During the juvenile phase mortality rates gradually decline to around 10 - 20% per month during their second year as '1' group fish (Bannister et al., 1973) [Note; Plaice in common with most other northern hemisphere teleost species have a nominal 'birthdate' of 1<sup>st</sup> January and will therefore remain as '0' group fish until 31<sup>st</sup> December after which they become '1' group fish]. The main predators switch from *Crangon* to shore crabs (*Carcinus maenas*) and fish as the juvenile plaice grow (Beverton & Iles, 1992). During the late summer and autumn the juvenile plaice gradually move into deeper water. A portion of 1 group and even 2-group fish may return to shallow waters in successive years, particularly in productive areas like the Wadden Sea (Kuipers, 1973). These fish may exert an element of cannibalism on the younger fish in the area but this does not appear to have been well studied (Kuipers, 1977). Adult plaice feed on a wide variety of demersal organisms. They feed on larger molluscs including *Macra* small

scallops and razor shells, worms including *Aphrodite*, small crabs, brittle stars (*Ophiura spp.*) and even small fish such as sandeels.

There is some evidence that plaice diets may have changed over time since bivalves appeared to be more important in studies conducted in the early 20<sup>th</sup> century (Todd, 1905; Todd, 1907; Todd, 1915). This may reflect a long-term reduction in bivalve abundance in the southern North Sea, perhaps due to beam trawling (Callaway et al., 2007; Frid et al., 2000; Rumohr & Kujawski, 2000) although changes in nutrient loading and oceanography have also occurred in this region (Jennings & Kaiser, 1998). Rijnsdorp et al., (2001) examined plaice stomach contents inside and adjacent to the plaice-box protected area but no consistent differences in diet were detected between these locations.

Once beyond the juvenile stage, plaice are not major predators, or major prey of other fish e.g. plaice comprise only around 0.2% of stomach contents of cod (DAPSTOM database, Cefas). Plaice have been included in ECOPATH models representing how the North Sea foodweb appeared in the 1980s (Christensen, 1995) and reconstructing the possible foodweb before heavy fishing (Mackinson, 2001). The North Sea ECOPATH model has recently been upgraded to include spatial representation (Mackinson & Daskalov, 2007). The ICES Working Group on Multispecies Assessment Methods have recently begun work on comparing results from North Sea Ecopath with Ecosim (EwE) models with results from multi-species virtual population assessment (MSVPA). However, because of the low inter-action of plaice with other fish species, this is unlikely to lead to substantial revisions in the perception of energy flows to or from this species. Plaice were also included as a key component in the demersal benthivore guild in the food web analyses of Greenstreet et al., (1997) and Heath (2005).

Plaice can be aged from the juvenile stage onwards using the seasonal growth rings on the otolith. A wide opaque ring is laid down during the major growth period in spring and summer, and a narrower translucent ring during the winter months. In young fish up to about six year old from the southern North Sea, these alternating zones can be clearly seen with the naked eye using transmitted light and easily read with the aid of a low power microscope (Plate 2). For older plaice, in particular from the central North Sea, the contrast between the two zones can often be poor leading to greater difficulties in obtaining a precise age.



**Plate 2 Plaice otolith from six year old fish showing seasonal growth**

The time series of recruitment of juvenile plaice to the North Sea plaice stock extends back to the 1950's. This indicates a fairly stable pattern around an average level of approximately a billion one-year plaice with occasional larger year classes. Generally speaking variability is not as great as for other demersal species where annual fluctuations of up to 100 fold may occur. The most notable year classes have often been produced following cold winters e.g. 1947 and 1963. Other large year classes have occurred since then, the most notable being in 1985 which was estimated to be twice as big as the 1963 year class. The 1996 year class was similar in size to 1963 and survivors are still found in the fishery. The 1980's saw a period of sustained good recruitment but in recent years recruitment has



been close to the long term average. Mortality during the egg and larval phases is likely to be the main factor determining overall year-class strength in North Sea plaice (Bannister et al., 1973). However the mechanisms which operate during the planktonic phase to generate annual variability in settler supply and the interactions of this settler supply with nursery ground mortality processes are not clearly understood (van der Veer and Witte, 1999).

### 4.3 History of the Fishery

The North Sea plaice fishery has been economically important to countries bordering the North Sea for well over a century. Plaice were first exploited by fleets of sailing smacks deploying small beam trawls and then towards the end of the 19th century by steam trawlers. This period saw a rapid increase in the exploited area of the North Sea as sail gave way to steam and subsequently as trawlers adopted the recently developed otter trawl (Millner et al., 2005).

The importance of plaice to UK fisheries at the turn of the century can be judged from the annual reports on plaice landings and biology made at this time e.g. Todd (1905 and 1907). The stock may already have been heavily exploited at this time as landings and the average size of the fish caught increased after the First World War<sup>1</sup>. After the Second World War plaice was traditionally the mainstay of English east coast ports such as Lowestoft, with its side trawler fleet and for the seiner fleet from Grimsby. The main plaice fishery was then predominantly in the central North Sea but in recent years it has moved to the southern North Sea as the more valuable sole (*Solea solea*) became the principal target species. In terms of landings, plaice were for many years the most important single flatfish to the fisheries of Europe and it remains the most important in the North Sea with an annual quota of around 50,000t compared to a comparable quota for sole of around 15,000t. The extensive biological and landings data available for North Sea plaice played a key role in the development of the mathematical analysis of fish population dynamics (Beverton and Holt, 1957).

Traditionally, plaice were taken by otter trawl, seine and gill nets but with the advent of highly efficient beam trawlers, initially mainly from the Netherlands, the English east coast otter trawl fleets declined. Now most of the catch is landed into the Netherlands either by their own beam trawl fleet or by Dutch beamers fishing on the register of other countries such as Germany and the UK. In 2008 the Netherlands fleet took 42% of the catch whilst UK vessels took 23% landing around 85% of that into the Netherlands (ICES, 2009a). Denmark was the only other country with a significant catch in 2008 taking around 17% of the total landings.

The use of twin otter trawls to fish for plaice is a relatively recent innovation. In the Netherlands, twin trawls have been used since 1997 and in 2002 there were 47 Dutch vessels employing this method (Grift et al., 2004a). Landings by the UoC are made into the Netherlands and constitute less than 2% of the total plaice landings. The main reason for the change to twin rigs is the reduction in fuel used and improved condition of the landed fish. However there are also big gains in terms of sustainability of the fishery through significant reductions in discarding and a reduction in the impact on the sea bed, compared with beam trawling. Twin rig vessels fish at a slower speed, 2.5-3.5 knots, compared with 4.5-6.5 knots by a beamer and since the gear is substantially lighter, fuel consumption is reduced by up to 40% (Grift et al., 2004a). Twin rig fishing involves long hauls of between 3-5 hours and this is only possible if the uptake of benthos and debris including sand and stones is minimal. However, the light gear results in a much reduced landing of sole and so the fishery is only profitable if the vessels have a high quota of plaice and are able to catch a range of other relatively high priced species such as lemon sole, turbot, brill and red mullet. The nets have a number of features designed to reduce the discarding of unwanted by-catch. Cod catches are reduced by lowering the headline height from 3m in typical twin rigs down to 1.5-2m and by the inclusion of a square mesh panel in the top side of the net. The uptake of benthos is considered a serious problem because it tends to damage the retained commercial fish catch, increases the sorting and handling time for the crew and can cause damage to the lightweight net. The main attempt to reduce discards is through the design and attachment of the

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<sup>1</sup> This point is very relevant to the debate over what the correct target for Bmsy should be for this stock.

footrope. Relatively wide spacing between the rubber rollers on the footrope reduces the catch of benthos allowing small individuals to pass between the rollers. The client reports that the attachment of the net directly on top of the footrope also greatly reduces the amount of benthos caught. Fishing is confined to sandy or muddy-sand seabed, areas with rocks are avoided because they will damage the gear. Rockhopper modifications are not employed in this fishery.

#### 4.3.1 Vessels and gear

There are four vessels operating within the client group. Table 1 presents vessel characteristics and Plate 3 shows one of the vessels, the Neeltje.

**Table 1 Vessels operating within the Oprey Trawlers client group**

PLN	Name	LOA	GT	kW
E104	Ansgar	36.60	435	710
H357	Good Hope	32.90	300	656
PW447	Louwe Senior	36.60	432	746
H426	Neeltje	28.80	329	650



**Plate 3 Osprey Trawlers vessel, Neeltje**

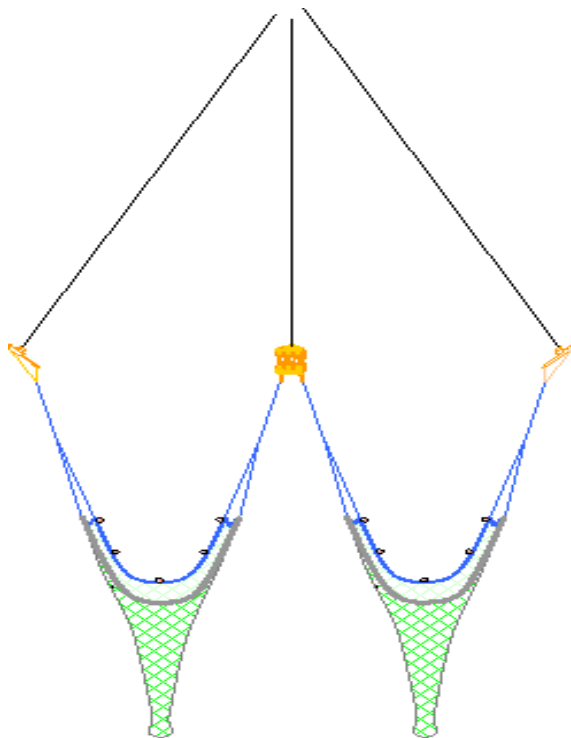
The four vessels in the UoC operate with different mesh sizes depending on the location fished. North of the designated flatfish area (55°/56°N) fishing is carried out with cod end mesh greater than 110mm. South of this, vessels are required to fish with smaller mesh gear in order to qualify for additional days at sea and the mesh size used is 95-100mm. The otter trawl design will be standardised across the four MFVs in the UoC. The gear is lightweight so is suited to operating on sandy seabed types. Fishing the gear over rocky ground would risk damage to the gear.

In general terms the trawl (Figure 2) is rigged as follows:

- Twin rigged
- A chain clump is used and weighted in accordance with the net designer's specification (1200-1300 kg).
- Two steel trawl doors size 5m<sup>2</sup> and weighing 1250kg with shoes are used to keep the mouth of the

net open. There is regular contact with the trawl doors on the seabed, although vessels attempt to minimise this to conserve fuel and reduce damage. Trials are continuing with new door designs on the 4 vessels which are lighter and semi or fully pelagic which are intended to have no contact with the seabed. Note that if these trials are successful these doors would be adopted by the UoC without affecting this gear specification.

- 220m wire sweeps with 70mm rubbers and every 50m a 200 mm rubber, reducing ground contact. The client reports that these sweeps have a very light contact with the seabed, actually herding the fish by vibrating above the seabed.
- The fishing line (footrope) has three sections of rubber footropes. The middle section is 5m long and consists of sets of three 200mm diameter rubber discs separated by gaps consisting of three 70mm diameter spacer discs. The next section is also 5m in length and is similar to the middle section but with the larger rubber discs reduced in size to 175mm. The outer sections are 11m long and here the discs are reduced progressively from 150mm in the first 6m to 130 in the final 5m. The spacing between the discs is larger than in the previous sections with up to 6 of the 70mm diameter spacers between each rubber disc.
- A key feature of the rig is that the net is attached tightly to the top of the footrope. This ensures that most benthos rolls under the net.
- Four light tickler chains are fitted near the back of the footrope. The front three ticklers are the longest and made from 10mm diameter steel links. These ticklers are usually mounted with swivels to prevent the chains twisting up as it moves over the seabed. The last and shortest tickler is made from 13mm diameter link chain.
- Approximate headline height (the distance between the footrope and headline when fishing) is 1.5-2m.
- Lightweight polyethylene netting in the codend results in a buoyant codend
- A square mesh panel (SMP) with 120mm mesh and at least three metres in length is sewn into the top half or top sheet of the net between the front of the extension piece and the cod-end.
- Chafers are not used under the codend.



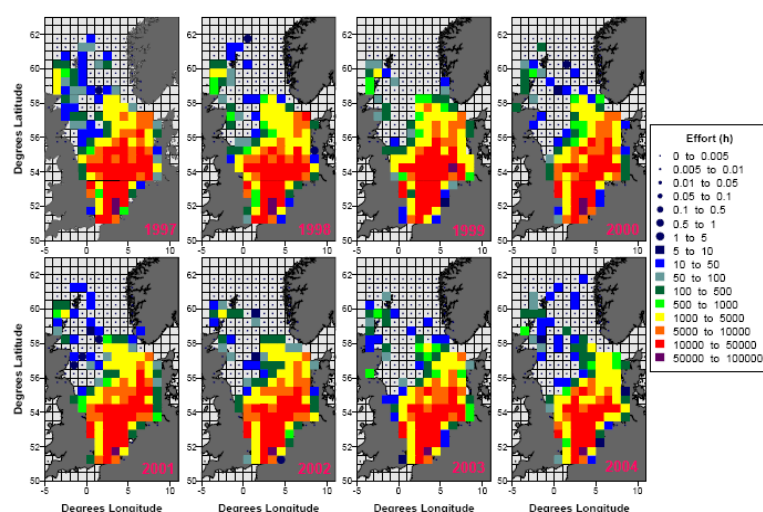
**Figure 2 Diagram of the twin-rigged otter trawl**

Three warps are used, one to each of the otter doors (orange) and one to the central clump weight (orange) between the nets. The blue line represents the sweeps and the footrope. The cod end is at the end of the net. (Diagram provided by Seafish Industry Authority).

Vessels fishing with twin rig otter trawls are regulated by a number of technical and conservation measures under the EU CFP. The main measures determining mesh sizes are the Conservation Regulation (Council Reg 850/98) and technical measures introduced to assist the recovery of cod stocks (Commission Regulation 2056/2001). North of latitude 55°/56°N, the minimum mesh for twin rig trawling is 100mm and the by-catch of cod is restricted to < 20%. South of this area, twin rig vessels fishing under the UK register are required to fish with mesh size between 95-99mm and again restricted to less than 20% cod

#### 4.3.2 Location of the fishery

Plaice fisheries occur widely throughout the southern and central North Sea mainly south of 58°N but the most intense fishing is in the south-eastern North Sea (Figure 3). South of 56°N, plaice is taken in a mixed fishery with sole.



**Figure 3 Spatial distribution of fishing effort (hours fishing) using beam trawl by the nine major nations operating in the North Sea between 1997 and 2004**

Note: The highest intensity of fishing is shown in red. (from Greenstreet et al., 2007).

In recent years there has also been a shift in the location of fishing effort into the southern and south-eastern North Sea (Figure 3). Most plaice are now taken by beam trawlers in the mixed (plaice and sole) flatfish fishery in the south-east of the North Sea.

Twin rig vessels greater than 300HP (220kW) are excluded from fishing within the 12-nautical mile coastal zone and from the Plaice Box, an area along the continental coast with a high abundance of juvenile plaice. The Plaice Box was introduced in 1989 as a seasonal closure and this was extended to all quarters in 1995. An STECF evaluation of the Plaice Box indicated that ‘from trends observed it was inferred that the Plaice Box has likely had a positive effect on the recruitment of plaice but that its overall effect has decreased since it was established’ (ICES 2009a). In the permitted plaice fishery, by small vessels using an 80mm mesh size, inside the ‘Plaice Box’ more than 90% of the plaice caught are discarded (ICES, 2009a; Grift et al., 2004b).

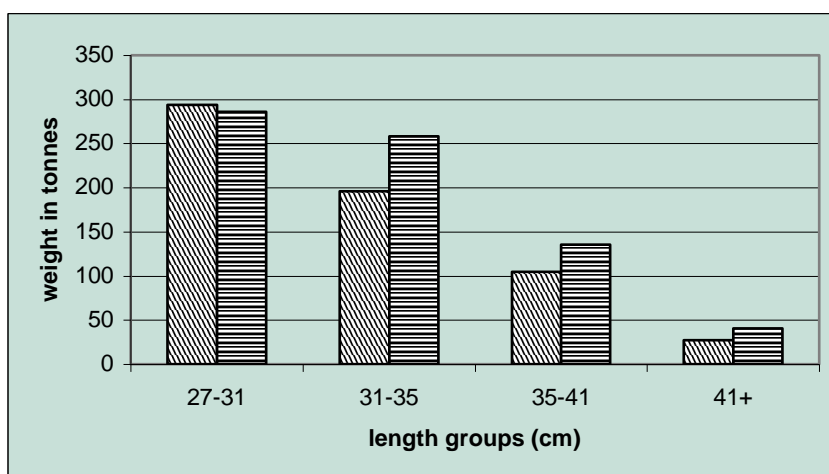
#### 4.3.3 Landings by twin rig vessels in the UoC

Landings of plaice by vessels in the UoC amounted to 621 tonne in 2008 and 720 tonne in 2009 compared with total international landings by all gears of 49,000t. Plaice dominated the mix of species landed in both years, representing 76-87% by weight of the landings and around 66-78% of the value (Table 2). Lemon sole, dab and turbot were the next most important flatfish species landed, contributing between 10% and 17% of the total by weight. Small amounts of cod were also landed but these represented a nominal 2% of the total landings and just under 4% of the value.

**Table 2 Annual landings by the UoC for 2008 and 2009**

2008				2009			
	kg	% wt	% value		kg	% wt	% value
plaice	621009	76.3	66.0	plaice	720117	87.0	77.7
lemon sole	65996	8.1	14.2	dab	42639	5.2	7.9
dab	59414	7.3	6.9	lemon sole	26710	3.2	5.4
cod	17918	2.2	3.6	cod	15914	1.9	3.7
mixed spp	13738	1.7	2.9	turbot	10517	1.3	3.0
turbot	12537	1.5	2.4	mixed spp	4316	0.5	0.8
<b>Total all spp</b>	<b>813684</b>			<b>Total all spp</b>	<b>827275</b>		

The plaice catch is sorted into four size categories for sale after landing, equivalent to fish 27-31cm (category 4), 31-35cm (category 3), 35-41cm (category 2) and >41cm (category 1). The length composition of the landings of plaice from three UoC vessels all fishing with 100+mm mesh is shown in Figure 4. The most abundant size group in the landings in 2008 and 2009 were in the smallest size categories, 27-31cm.



**Figure 4 Profile of landings of plaice by EC market size category for vessels in UoC in 2008 (diagonal bars) and 2009 (horizontal bars).**

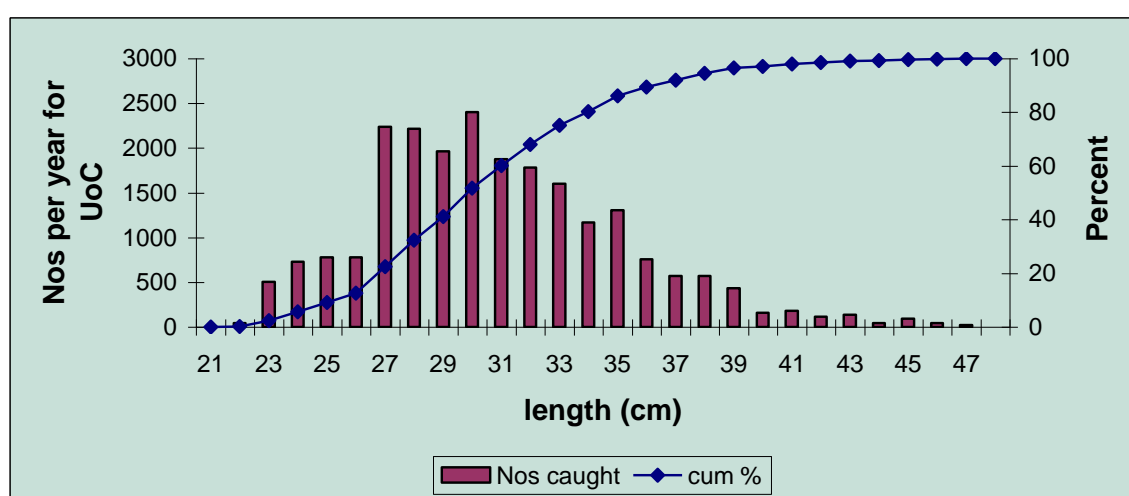
(Source: B. Keus, *pers comm.*).

### Discarding of plaice by twin rig vessels in the UoC

High numbers of plaice are discarded in the main beam trawl fisheries in the North Sea. Overall ICES estimates that 80% in numbers and 50% by weight of plaice are discarded (van Keeken et al., 2004b). The highest level of discards comes from the beam trawl fishery in the south-eastern North Sea where 80mm mesh nets are in use. In contrast, twin rig trawling as carried out by the UoC targets larger plaice on more offshore grounds and is therefore expected to show a significant reduction in the level of plaice discards. However, there is relatively little published information on the level of plaice discarding by twin rig trawlers particularly from vessels using meshes in excess of 80mm, but some data is available directly from a number of sources including: i) data from self sampling on board the vessels in the UoC ii) samples collected from scientific observer trips on vessels in the UoC and iii) data from a study of twin rig vessels undertaken by IMARES (van Keeken et al., 2004a; Grift et al., 2004a) iv) net selectivity studies.

i) self sampling. As part of a scheme coordinated by the Dutch Fish Product Board to provide independent data on the level of discarding from commercial vessels, samples were collected directly by the crew of MFV PW 447 on a number of trips during 2007 and 2008 (B Keus *pers comm.*). On

each trip a basket of mixed fish was taken from one or two hauls and sorted into retained and discarded fish. The volume of plaice retained and discarded was recorded together with detailed information on the haul position, date of sample and number of hauls for the full trip. The data were made available to the assessment team and the results for 21 hauls were analysed for length distributions of retained and discarded plaice. The percentage discarded by twin rig trawls fishing with either 110mm or 120mm gear was also examined. Figure 5 shows the cumulative percentage caught (discards + retained) by length from twin trawlers using 110mm and 120mm mesh combined, together with the estimated numbers at length raised to the total UoC fleet over one year. The figures are likely to be highly variable since they are based on only 21 trips by a single vessel but raised assuming uninterrupted fishing and similar discard rates by all 4 vessels over a year. Discards of plaice under the MLS of 27cm were low and contribute about 15% of the total. Half the catch were fish of 30cm or larger. The discarding rate from 16 hauls in 2008 varied widely from zero discards up to 52% in one haul. The average discard rate was 17% and it was similar for both the 110mm and 120mm gear.



**Figure 5 cumulative percentage caught at length from samples taken by crew on UoC vessel PW447**

ii) scientific observer trips. Observers from IMARES have carried out sampling on one 120mm twin rig vessel (GY127 – note that this vessel is not part of the UoC being assessed but that the gear used is similar) during June and August in 2009. A total of 39 hauls were sampled and the plaice discard rate averaged 9% by number for the two trips.

iii) A study was undertaken by IMARES for the Dutch Fish Product Board in 2002-2003. A total of 5 trips with twin rig gear using 80, 95 and 100mm mesh were analysed and the discard levels compared with trawling by 80mm beam trawl (van Keeken et al., 2004a). Two of the trips are not directly comparable with the UoC because one targeted *Nephrops* with 80mm gear and the other was a small (<300 HP) vessel fishing with 100mm gear but closer inshore where the number of small fish and benthos is substantially higher. The results for three trips with 95mm gear are shown in Table 3. Although discarding of plaice by twin trawlers on these trips was relatively high there is a marked reduction compared with beam trawlers. On average, twin rigged trawlers with 95mm mesh discarded 377 plaice/hr (60%) and 49 kg/hr (42)% (van Keeken et al., 2004a). This compares with the number of plaice discarded by 80mm beam trawl fishing at the same time of 979/hr. These numbers differ slightly from data provided by Grift et al., (2004a) who found that twin trawlers discarded 467 plaice/hr compared with 918/hr by beam trawl. The difference in the discarding of benthos was even more marked with beam trawlers discarding six times as much as twin trawlers (Grift et al., 2004a).



**Table 3 Discards of plaice in twin-rig trawlers using 95mm mesh\***

year (trip)	<i>Nos/hr</i>				<i>kg/hr</i>		
	mesh	landed	discarded	% discard	landed	discarded	% discard
2001 (1)	95	222	464	68	58	57	50
2002 (2)	95	206	108	34	59	12	17
2003 (5)	95	332	559	63	90	78	46
<b>Average</b>		<b>253</b>	<b>377</b>	<b>60</b>	<b>69</b>	<b>49</b>	<b>42</b>

\*The table shows the numbers and weight landed and discarded per hour fished (revised from Table 4, van Keeken et al., 2004a).

The levels of discarding found in the IMARES study from 2001-2003 are substantially higher than the discard rates in the fisher self-sampling and observer studies in more recent years (sections i and ii above). One possibility is that the areas fished differed. Fishing in deeper water and away from the coast substantially reduces discards of small plaice but, unfortunately, there was insufficient data to make direct comparisons of the locations fished between the various studies.

iv) Net selectivity studies. The discarding of plaice from trawl nets is dependent on the complex interactions of fish size, behaviour, shape and condition and net mesh size, twine types and net design. However, the key factor is the interaction between mesh size and fish length. Numerous studies have been carried out to look at the proportion of fish at different lengths discarded by nets of varying codend mesh sizes (eg Wileman, 1992). Small fish tend to escape through the net while larger fish are retained and cannot escape. In between these extremes, varying proportions are caught. The length at which 50% are retained by the net is called the  $L_{50}$ . The  $L_{50}$ s for typical mesh sizes used in the flatfish fishery in the North Sea are shown below:

Mesh size (mm)					
	80	95	100	110	120
$L_{50}$	17.6cm	20.9cm	22cm	24.2cm	26.4cm

In the case of 80mm nets which are designed to target sole, the  $L_{50}$  is 17.6cm and this indicates that at least half the fish at 17cm which are taken into the net will be retained together with increasing proportions above this size. Since the MLS is 27cm, it will be necessary to discard large amounts of fish between 17 and 27cm. The  $L_{50}$  only increases slowly in nets in the range 80-110mm and remains below 27cm until approximately 125mm mesh is used. So for plaice, at least, the gains in terms of discard rates are relatively small until larger mesh nets in excess of 110mm are used.

#### Summary of discard data for plaice

Earlier studies (van Keeken et al., 2004a) show modest reductions in the percentage of plaice discarded compared with beam trawling. However, in view of the small scale of the fishery (490t compared with 49,000t in total), the absolute level of discards will be small. In more recent studies which may be closer to current commercial practice, the levels of discards of plaice in numbers by twin rig trawlers was substantially lower than by beam trawl, averaging 17% in fisher self sampled trips and less than 10% in scientific observer trips in 2009 compared with around 80% by beam trawl. In terms of MSC criteria for sustainable fishing, this represents a significant improvement compared with beam trawling.

## 5 STOCK ASSESSMENT

### 5.1 Management Unit

There is a single management unit covering the whole of ICES subarea IV. However, there is known to be migration both between the North Sea and the Skagerrak (ICES division IIIa) and between the North Sea and the eastern Channel (ICES division VIIId). Tagging data has shown that there is a spawning migration between the North Sea and the eastern Channel in December and January involving between 13 and 30% of the plaice from the southern Bight (Hunter et al., 2004a,b; ICES 2009b). There is also a movement of juvenile plaice from the North Sea nursery grounds on the Belgian and Dutch coasts into the eastern Channel. Analyses of these movements for management of North Sea plaice (Kell et al., 2004) indicate that they have little impact on the assessed status of the North Sea stock but may be more problematic for the assessment of eastern Channel plaice.

### 5.2 Assessments and stock status

#### 5.2.1 Assessment

Assessment of this stock is carried out by the ICES Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK). Prior to 2007 the Working Group met annually, in September each year, and their assessments were reviewed and endorsed subject to any changes, by the ICES ACFM (now ACOM) at their meeting in October. The Working group now meets in May which allows their assessments and report to be reviewed and endorsed at the May meeting of ACOM (ICES 2009a). The Working Group does not carry out a full assessment of all the thirteen stocks in its portfolio every year. Instead, and where applicable, it has a rolling programme of a 'Benchmark' assessment followed by a series of 'Update' assessments. However the assessment of North Sea plaice is on the ACOM observation list which means that at present a full benchmark assessment is carried out every year (ICES 2009b). The assessment uses official national landings data which is recorded by all countries participating in the fishery, and reported to ICES, together with the total landings estimated by the Working Group. The unallocated landings data which represent the difference between the official landings and the WG estimate has averaged less than 1.5% of the total over the past six years with the highest figure of 3.5% in 2006 falling to 2.4% in 2008. The accuracy of landings data is continually monitored at national level. Estimated landings for 2008 were 47,682t which is 1,349t less than the previous year and just below the TAC of 49,000 for 2008.

Landings data are collected by sex separately from Netherlands and Belgium (accounting for 50% of the landings) and sex combined for all other countries. Age, length and maturity data are collected by the Netherlands, France, Germany, Denmark and Belgium. Sampling levels are currently considered to be satisfactory. The greatest uncertainty in the assessment is generated by the level of discarding. Discards form a substantial part of the total catch but they cannot be well established from the low sampling levels at present. There is significant discarding of plaice, in particular in the North Sea beam trawl fishery targeted at sole. The proportion of plaice discarded in this fishery has increased considerably since the 1970's and is now estimated to be 80% by number and 50% by weight. Discard estimates are based on observer programs in the Dutch, UK, German and Danish fleets for 2000-2008. Prior to that, a reconstructed discard series for 1957-1999 is used (ICES 2005). Since 2004 a 'self sampling' program for discarding has also been in operation within the Dutch beam trawl fleet that provides valuable additional data on spatial and temporal trends in discarding.

Natural mortality is set at 0.1 for all ages whilst maturity is set at 0.5 for ages 2 and 3 and fully mature from age 4 onwards. In the assessment of the stock these values are assumed to be constant over time because incorporation of historic changes has been shown to have little effect on the estimation of SSB which is used to assess biological sustainability.

Fishery independent information in the form of CPUE (Catch Per Unit Effort, the quantity of fish caught by a standard amount of fishing effort) data is available from three separate research vessel



surveys. The RV surveys generate age disaggregated tuning indices which are currently used in the stock assessment process to calibrate the assessment. Surveys consist of two Dutch research vessel surveys using an 8m beam trawl with 40mm mesh cod end. One survey, begun in 1985 covers the south-eastern part of the North Sea (BTS-Isis) and the other, started in 1996, covers the central North Sea (BTS-Tridens). Up to 2001 both surveys were used as tuning indices for plaice age groups 1-4 but since 2001 age groups up to 9 have been included. A third Dutch survey (SNS) is carried out in September/October using a 6m beam trawl with 40mm mesh cod end. This survey is targeted at juveniles, with transects perpendicular to the coast. It provides a time series of tuning data back to 1990 for plaice ages 1-3 for the assessment and a '0' group index for the estimation of recruitment. Additional coastal surveys (DFS) are conducted by a number of countries and a combined international index used for estimating recruitment of plaice at age 0 and 1. Commercial LPUE (Landings Per Unit Effort) data from the Dutch beam trawler fleet and the UK beam trawler fleet up to 2002 (excluding flagged vessels) are also available to the Working Group but are currently only used in exploratory analyses of the data and not in the final assessment.

The assessment model used for this stock is an aged based model, the extended survivors analysis (XSA), using landings and discards, calibrated with three fishery independent, survey indices. The XSA model has been used within ICES as an important tool for catch-at-age analysis for all demersal stocks. Careful consideration is given by the WG each year to the appropriateness of all aspects of the model parameters in relation to each species. In addition, in 2009, a statistical catch at age model (SCA) developed by Aarts and Poos (2009) was used alongside XSA. This model has the advantage that it includes data on landings and discards separately and allows for observational errors on those and other data sources. The output from this model provides SSB estimates with 95% probability bounds around the median.

The output from XSA shows a retrospective bias with F being overestimated and SSB underestimated. In particular, the current assessment estimates the biomass over the last three years at a considerably higher level than in previous assessments. The retrospective pattern is considered by the WG to be driven by high abundance indices in all three tuning series for 2006-2008 and especially the higher signal in the BTS-Tridens index which covers the more northern part of the North Sea. A bias in this direction is more precautionary than if the assessment regularly overestimated the stock size.

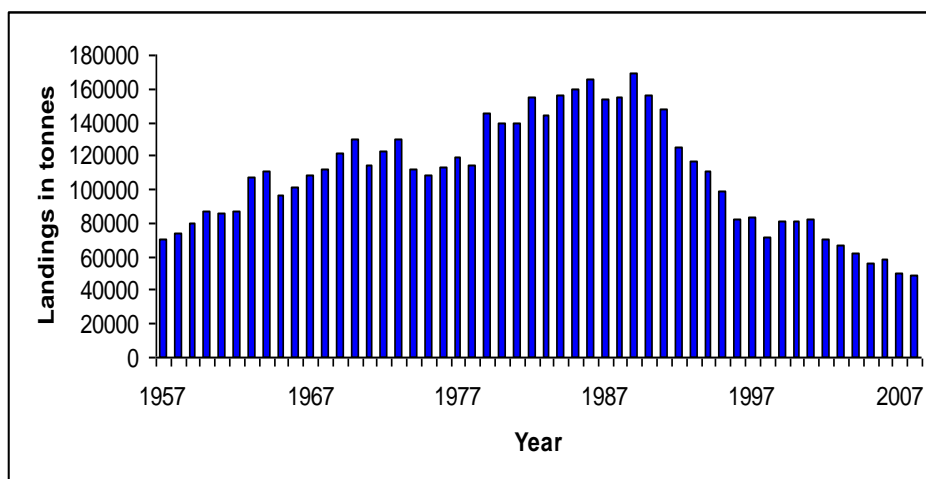
The signal from the three survey indices gives large differences in the estimation of biomass and F. The more northern BTS-Tridens survey gives the highest abundance and is strongly weighted in the assessment. The WG have accepted that this is consistent with data from this survey as the cohorts being estimated strongly now reach the age where the index receives a higher weighting in the assessment. In future, the WG intend to derive a combined index from the three surveys.

The largest uncertainty in the assessment is considered by the WG to be due to the inclusion of discards which are poorly sampled. XSA does not allow this uncertainty to be accounted for in the assessment. However, since the exclusion of discards is likely to result in bias in the estimate of biomass and mortality, the current assessment model is regarded as preferable to one without discards.

## **5.2.2 Stock Status**

Based on the most recent estimate of SSB (in 2009) and fishing mortality (in 2008), ICES classifies North Sea plaice as having full reproductive capacity and as being harvested sustainably. SSB is estimated to have increased above the precautionary reference level (Bpa). Fishing mortality is estimated to have decreased to below precautionary reference level (Fpa) and the longer term fishing mortality target level (Ftarget) (ICES 2009a).

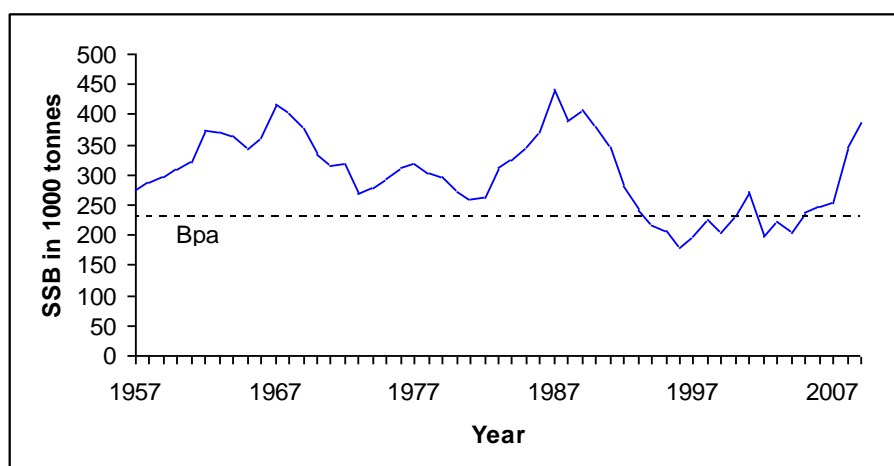
Total annual landings of plaice in the North Sea were around 70,000t in the late 1950's increasing to over 100,000t in the 1960's, further increasing to over 150,000t during the 1980's (Figure 6). Peak landings of 169,800t were recorded in 1989 since when there has been a steady decline to around 50,000t in 2008.



**Figure 6 Annual landings of North Sea Plaice from 1957 to 2008**

(Source: ICES 2009a).

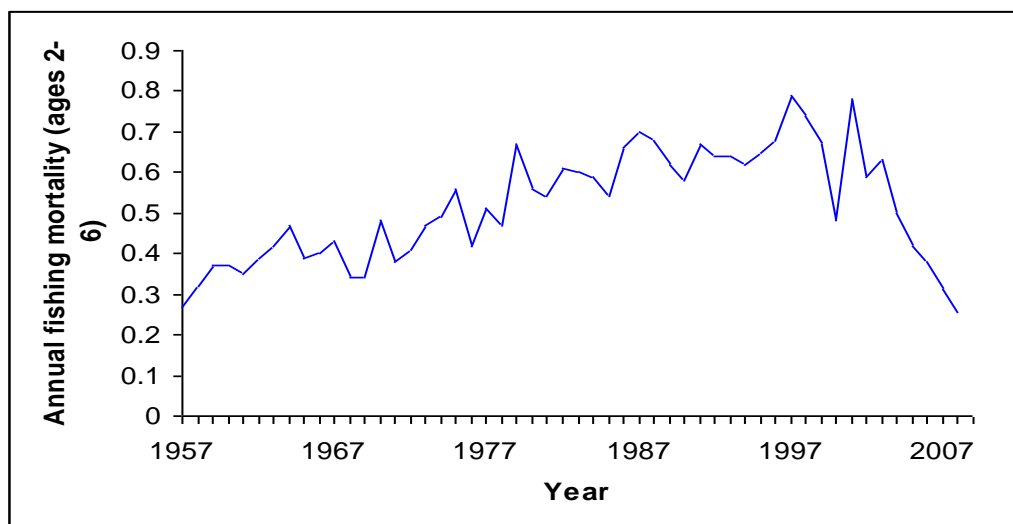
The trend in the spawning stock biomass is shown in Figure 7. The stock declined sharply during the 1990s from a peak of over 400,000t in 1987 and fell below the Precautionary Approach level (Bpa – the level of spawning biomass that should avoid recruitment failure with a high degree of certainty) of 230,000t during a number of years in the period 1994–2004. In recent years the stock has shown signs of a recovery and the SSB at the start of 2009 was estimated at around 388,000t by ICES (2009a,b). This is well above the precautionary reference level. Although the estimates of the SSB and fishing mortality are considered uncertain, it is evident that the stock has increased considerably and the fishing mortality has been reduced. The increase in the stock has occurred under average recruitment conditions and is not caused by a higher productivity of the stock. The main reason for the increase of the SSB is considered by ICES to be the reduction of fishing mortality under the present management plan. However the perception of SSB has changed considerably from last year's assessment and the current estimate for 2008 is 80,000t higher than the previous estimate (ICES, 2009a). This change in perception is partly due to the assessment model which gives more weight to the survey information from the BTS Tridens survey in the western North Sea. This survey observes mainly the older age groups and over the last two years they have become more abundant in this part of the North Sea reflecting a possible change in distribution of older plaice. There is therefore some uncertainty as to the true SSB level for North Sea plaice in relation to biological reference points but it is clear that the stock is now well above Bpa.



**Figure 7 Spawning Stock Biomass (SSB) of North Sea Plaice for the period 1957 to 2009 with Bpa shown**

(source: ICES 2009a).

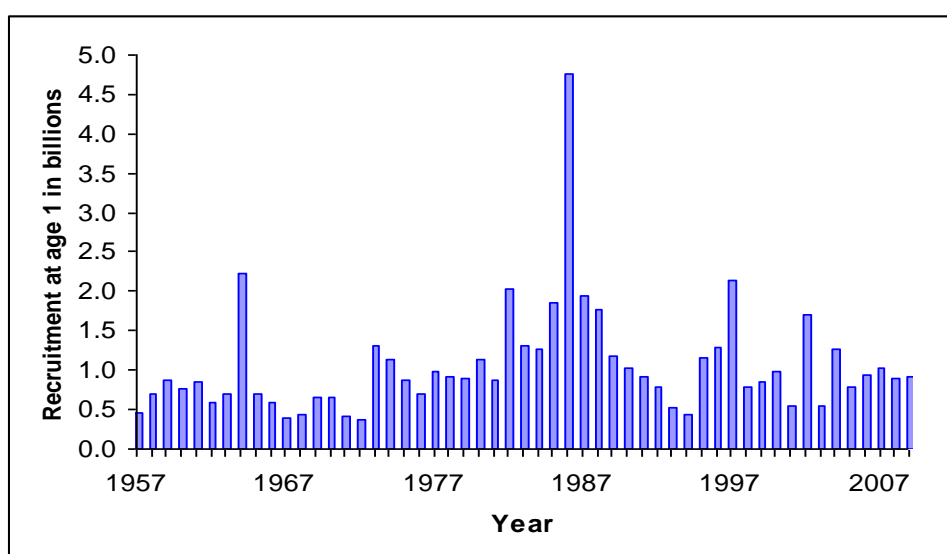
Total fishing mortality (Figure 8) which includes both human consumption and discard mortality showed a steady increase over the forty year period up to 1997 after which it started to decline with the exception of a brief increase between 2001 and 2003. Since 2003 it has decreased considerably reflecting the reduction in effort by the fishing fleet. It is estimated to have fallen below the precautionary reference level of 0.6 since 2005 and to be close to the long-term management objective of an  $F_{0.3}$ . At the same time, fishing mortality for the human consumption part of the catch is estimated to be  $F_{0.13}$  approximately half the mortality from discards.



**Figure 8 Total North Sea plaice fishing mortality (F) for ages 2-6 including discards and fishing mortality 1957 - 2007**

(source: ICES 2009a).

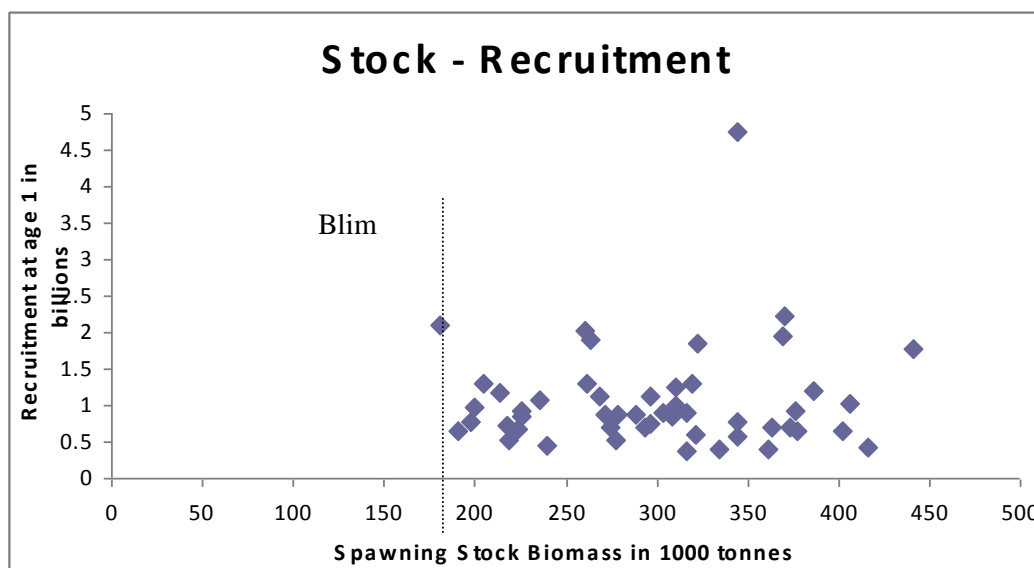
Estimates of abundance of fish recruiting to the stock at age one are shown in Figure 9. There was a period of increased recruitment during the 1980s with a particularly strong 1985 year class. In recent years, recruitment has been close to the long term average (approximately 1 billion 1 year olds) with slightly above average recruitment of the 1996 and 2001 year classes. Inter annual variability in recruitment is relatively small with the exception of a few strong year classes.



**Figure 9 Recruitment of North Sea Plaice in billions of fish at age 1 year (1957-2007)**

(source: ICES 2009a).

There is no strong relationship between spawning stock size and recruitment and there is no indication of a minimum spawning stock size below which subsequent recruitment is likely to be impaired (Figure 10).



**Figure 10 Relationship between spawning stock size and recruitment at age 1 for North Sea Plaice**

### 5.3 Management advice

(Council Regulation (EC) No. 676/2007, article 7).

#### **Management in relation to Maximum Sustainable Yield targets.**

At the World Summit Conference on Sustainable Development in Johannesburg in September 2002, the EU member states signed up to limiting fishing to sustainable levels by maintaining or restoring stocks to levels that can produce maximum sustainable yields. For depleted stocks this should be achieved urgently, and where possible not later than 2015([http://ec.europa.eu/fisheries/press\\_corner/press\\_releases/archives/com06/com06\\_40\\_en.htm](http://ec.europa.eu/fisheries/press_corner/press_releases/archives/com06/com06_40_en.htm)). The European Commission have embraced the principle and this has now been taken up by the MSC in relation to their certification of fisheries. Maximum sustainable yield (MSY), expressed either as biomass or fishing mortality, has now become the target reference point both for the certification of new fisheries and at annual surveillance of certified fisheries.

North Sea plaice is managed jointly between the EU and Norway although there is currently no agreed management plan. Instead, the EC has adopted a long term plan for the management of plaice and sole. European Council Regulation (EC) No. 676/2007) of 11 June 2007 established a multi-annual plan for fisheries exploiting plaice and sole in the North Sea. Paragraph 5 of that plan states that *‘The objective of the plan is to ensure, in a first stage, that stocks of plaice and sole in the North Sea are brought within safe biological limits, and in a second stage and after due consideration by the Council on the implementing methods for doing so that those stocks, are exploited on the basis of maximum sustainable yield and under sustainable economic, environmental and social conditions.*

Article 2 defines Safe biological limits as follows:

*1. For the purposes of this Regulation, the stocks of plaice and sole shall be deemed to be within safe biological limits in those years in which, according to the opinion of the Scientific, Technical, and Economic Committee for Fisheries (STECF), all of the following conditions are fulfilled:*

*(a) the spawning biomass of the stock of plaice exceeds 230000 tonnes;*

*(b) the average fishing mortality rate on ages two to six years experienced by the stock of plaice is less than 0,6 per year;*

Quite clearly North Sea plaice are well within safe biological limits both for SSB and fishing mortality thus fulfilling the requirements of phase 1. Objectives of the second phase of the EU management plan is defined under article 4 which states for plaice:

*1. The multiannual plan shall, in its second stage, ensure the exploitation of the stocks of plaice and sole on the basis of maximum sustainable yield.*

*2. The objective specified in paragraph 1 shall be attained while maintaining the fishing mortality on plaice at a rate equal to or no lower than 0,3 on ages two to six years.*

ICES management advice is precautionary and “consists of a dual system of conservation limits (limit reference points) and a buffer to account for the uncertainty of the knowledge about the present and future states relative to the conservation limit (precautionary approach reference points). The reference points are expressed in terms of single-stock exploitation boundaries (limits on fishing mortality) and biomass boundaries (minimum biomass requirements)” (ICES 2009a).

### **Limit reference points**

The minimum spawning stock reference point is described by the symbol Blim. Blim is set on the basis of historical data so that when a stock would be below Blim, there is a high risk that recruitment will ‘be impaired’ (i.e. substantially lower than when the stock size is higher). Below Blim there is a higher risk that the stock could “collapse”. The limit reference point for fishing mortality Flim is the fishing mortality that is expected to drive the stock to the biomass limit when it is maintained over time.

### **Precautionary reference points**

The biomass precautionary reference level is defined as Bpa. As long as the estimate of spawning biomass is at or above Bpa, the probability of actually being at or below Blim should be small. The precautionary reference level for fishing mortality is Fpa. When the estimate of fishing mortality is at or below Fpa, there should be a low probability of actually fishing at or above Flim.

Options for different levels of fishing mortality are presented to managers along with their likely effect on SSB in relation to the precautionary biomass level (Bpa). On the basis of the EC management plan, ICES advice for landings in 2010 is a TAC of 63,825t which is consistent with a minor reduction in fishing mortality from 0.25 to 0.24 (ICES 2009a). This TAC would imply an SSB in 2011 of 488,000t which maintains the stock significantly above precautionary reference levels.

Biological reference points for North Sea plaice are shown below (ICES 2009a):

Flim 0.74

Fpa 0.60

Fmax (the fishing mortality necessary to achieve  $B_{MSY}$  in the long term) 0.17\*

Blim 160 000 t

Bpa 230 000 t

Blim was set at 160,000 t as the lowest biomass that had produced average recruitment, and Bpa at a level that affords a high probability of maintaining SSB above Blim. Flim is Floss for ages 2-6 and Fpa is the fishing mortality that in the long term should lead to a 50% probability that  $SSB_{MT} \sim Bpa$ .

\*Note: There is a discrepancy between the ICES/ACOM advice which implies an Fmax of 0.17 and the EU and STECF advice for long term management which specifies an  $F=0.3$  to achieve MSY. The value of 0.3 was determined by the ICES *ad hoc* Group on Long Term Management Advice (AGLTA) and was adopted by the EU in its multi-annual plan for plaice and sole (Council Regulation

(EC) No 676/2007). The plan specifies that  $F_{0.3}$  is consistent with exploitation of stocks of plaice “on the basis of maximum sustainable yield”. The use of a very low  $F_{max}$  value such as 0.17 would result in an equilibrium stock in excess of 1 million tonnes. This is more than twice the size of the largest stock observed in the historical time series back to 1957. The assessors considered that the  $F_{0.3}$  specified by AGLTA and adopted by the EU was an appropriate candidate for MSY for this review.

ICES undertook an evaluation of the EC management plan and identified a number of shortcomings. These were a lack of robustness to the starting values of population abundance, systematic over-estimation of historic landings and under-estimation of bias and variance in the model. Until these aspects have been more fully examined, ICES was not able to reach a firm conclusion on the precautionary nature of the management plan for plaice.

## 6 FISHERY MANAGEMENT FRAMEWORK

### 6.1 Fishing rights, licensing etc.

Fisheries management is directed ultimately by the European Union under the Common Fisheries Policy (CFP). EU legislation directly affecting the fishery under assessment is:

- The Conservation Regulation (EC) No. 850/98 (and subsequent amendments) covers technical measures for the conservation of fishery resources. It is within this regulation that rules that govern minimum landings sizes, minimum mesh sizes, closed areas and restrictions of gear types are implemented.
- The Control Regulation (EC) No. 2847/93 (and subsequent amendments) covers the control of monitoring of conservation and fish stock management measures. This includes setting rules for inspection at sea, vessel monitoring, and recording of catches and logbook completion. This regulation also covers rules on landing declarations, transport documents, sales notes and effort and catch report.
- Quota Regulations – During December each year the Council of Ministers determine Total Allowable Catches (TACs) based on the scientific advice they receive from the ICES Advisory Committee (ACOM) (formerly the Advisory Committee on Fisheries Management ACFM) and the EU (STECF). It is noted, however, that ICES scientific recommendations are not necessarily fully followed by the Council of Ministers in determining TACs.

### 6.2 Fishing locations

The UoC operates in ICES sub-area IVb of the North Sea. The actual area targeted varies depending upon season and fish abundance, but is concentrated in offshore waters (outside 12nm) of the Netherlands, the UK and Denmark (**Error! Reference source not found.**).

### 6.3 Administrative Arrangements and Boundaries

Fisheries are managed through the Common Fisheries Policy of the EU in accordance with the basic fisheries regulation (2371/2002). Implementation of the CFP (and implementation of Habitats Directive etc) at a national level is carried out through the individual Member States. Member States Fisheries enforcement authorities (Inspectorates: DEFRA - UK, Marine Directorate, Marine Scotland Compliance -Scotland, Algemene Inspectie Dienst (AID)-The Netherlands, Fisheries Directorate-Denmark) co-operate in policing the fishery (e.g. satellite monitoring, landing recording etc).

The main basis for the management of the North Sea plaice fishery is the advice provided by the ICES Advisory Committee on Fisheries Management (ACOM). Scientific research and assessment is carried out by ICES Working Groups. The assessments are reviewed and evaluated by ACOM which then provides advice on the status of target and non-target stocks to the European Commission. ICES advice, via Commission proposals, informs the annual EU Council of Ministers regulation establishing management measures, in particular TACs and quotas.

The UoC is comprised of four English flag vessels, with vessels listed on the UK fleet register. Vessel licences are administered by the English Marine & Fisheries Agency (MFA), which give an entitlement to fish. The entitlement to catch a certain volume of plaice is given via a quota allocation, which is determined on an annual basis.

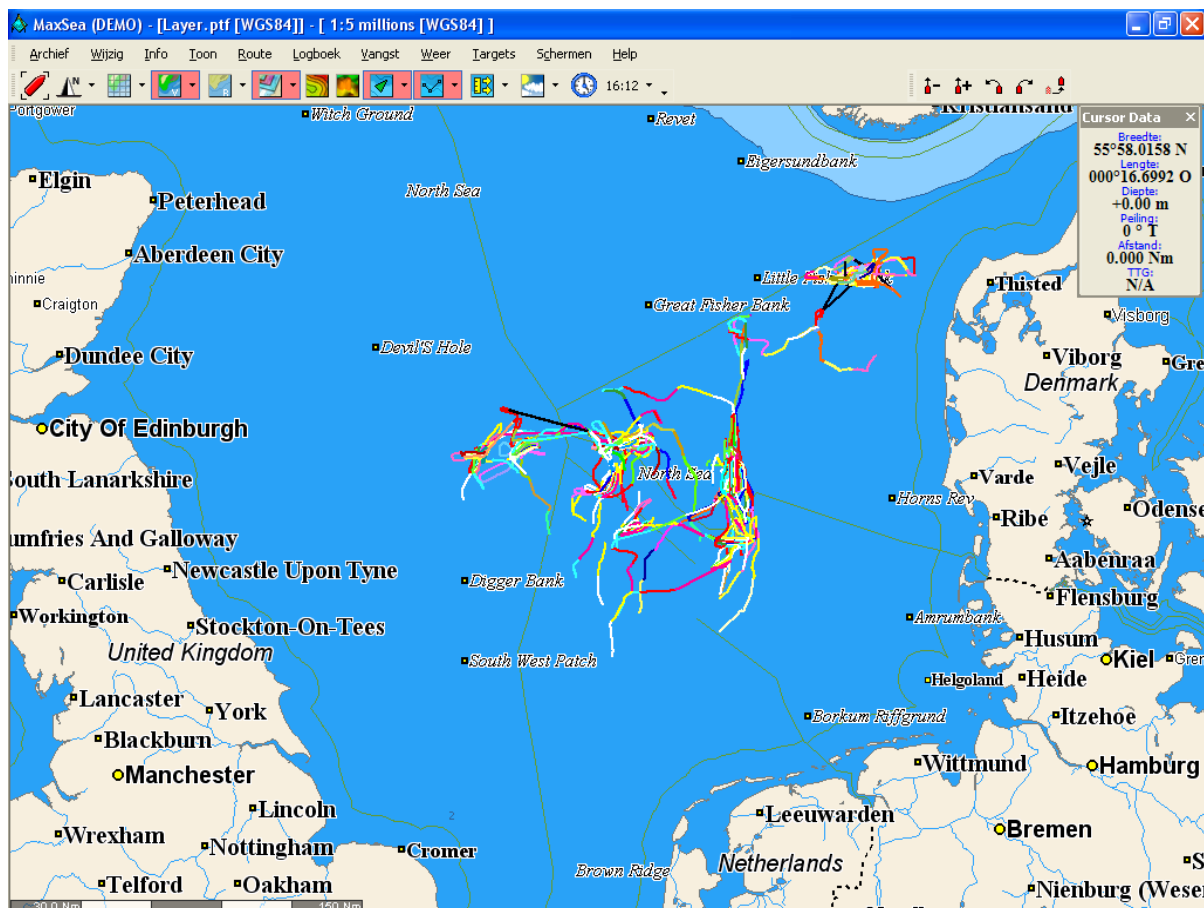


Figure 11 Location of tows undertaken by a UoC vessel in 2008

Source: Osprey Trawler Services

Quota is allocated by the responsible UK authority, the MFA, via a fixed quota allocation (FQA) per vessel. All vessels are members of the Lowestoft Producer Organisation (LPO). Quota management is via the PO, which has various monitoring and reporting responsibilities, but uptake of the FQA is managed directly by the owners and operators of the individual vessels. In 2009 vessels in the Lowestoft PO landed 99.5% of their FQA total amount. Just under 20t of plaice quota was unfished and therefore able to be distributed to vessels within the LPO should the need arise, thus avoiding the prospect of discarding marketable plaice due to a lack of quota.

#### 6.4 Legislation and Regulation

Fisheries management is directed ultimately by the European Union under the Common Fisheries Policy (CFP). EU legislation directly affecting the fishery under assessment is:

- The Conservation Regulation (EC) No. 850/98 (and subsequent amendments) covers technical measures for the conservation of fishery resources. It is within this regulation that rules that govern minimum landings sizes, minimum mesh sizes, closed areas and restrictions of gear types are implemented.
- The Control Regulation (EC) No. 2847/93 (and subsequent amendments) covers the control of monitoring of conservation and fish stock management measures. This includes setting rules for inspection at sea, vessel monitoring, and recording of catches and logbook completion. This regulation also covers rules on landing declarations, transport documents, sales notes and effort and catch report.
- Quota Regulations – During December each year the Council of Ministers determine Total



Allowable Catches (TACs) based on the scientific advice they receive from the ICES Advisory Committee (ACOM) (formerly the Advisory Committee on Fisheries Management ACFM) and the EU (STECF). It is noted, however, that ICES scientific recommendations are not necessarily fully followed by the Council of Ministers in determining TACs.

While competence for sea fisheries rests at EU level, the vessels of a nation state (such as UK in the case of the Osprey Trawler plaice fishery) have exclusive rights to fish within 6 nautical miles (nm) of baselines. Between 6 and 12nm, fishing by non-nation state vessels is restricted to those with historic rights relating to specific fisheries and specific countries. Within 12nm the nation state has the ability to take non-discriminatory conservation measures (provided that the EU has not already legislated in this area). In general, the only areas where the European Commission adopts measures, which have effect within 12nm, are in relation to TAC and gear regulations. This means that there is particular scope for nation states to introduce their own management measures in the inshore fisheries.

The UoC consists of UK-registered boats that are operated by Dutch owners in UK, Dutch and Danish waters. The vessels must therefore comply with the EU fisheries regulations, including those managing the North Sea plaice fishery; UK regulations in relation to management of the quota and any additional member state regulations concerning vessels fishing within their waters. All plaice landed by these vessels is administered by Dutch auctions (Urk) and must comply with Urk market regulations.

There follows a list of some of the operational roles and responsibilities to provide clarity in the case of the UoC. Most of these bullet points are further expanded upon in the text.

- EU fishery rules are followed in all EU waters by all EU MFV.
- Quota is sourced from the flag state - UK
- Quota uptake is checked by the member (flag) state – the Lowestoft PO and the MFA.
- Monitoring of MFV effort (days at sea) is carried out by member (flag) state –MFA – an automated process using VMS
- VMS tracks are automatically monitored by member (flag) state – i.e. the MFA. Under a data sharing agreement VMS data are also provided to the member state where the vessel is operating – i.e. The Netherlands.
- The UoC do not conduct fishing operations within the 12nm limit.
- Inspections at sea (gear, logbook and retained catch) are checked by the state with jurisdiction over the local sea. The flag state can inspect its own flagged MFVs no matter where the MFV is fishing (although typically permission will be sought from state with jurisdiction over the local sea simply as a matter of courtesy)
- Landings are checked (weight, size, species) at the port of landing by the local state, i.e. The Netherlands. A copy of logsheet is given to local state at the port of landing. The original copy of the logbook is sent to the flag state, i.e. the UK.

## **6.5 Harvest controls**

Harvest control rules are defined by the regulations listed under section 6.4. More specifically for the target species, plaice, harvest control is under the Long Term Management Plan for plaice and sole in the North Sea (Council Regulation no. 676/2007).

Article 7 of the LTMP states the Harvest Control Rules:

1. The Council shall adopt the TAC for plaice at that level of catches which, according to a scientific evaluation carried out by STECF is the higher of:
  - (a) that TAC the application of which will result in a 10 % reduction in the fishing mortality rate in its year of application compared to the fishing mortality rate estimated for the preceding year;
  - (b) that TAC the application of which will result in the level of fishing mortality rate of 0,3 on ages two to six years in its year of application.
2. Where application of paragraph 1 would result in a TAC which exceeds the TAC of the preceding

year by more than 15 %, the Council shall adopt a TAC which is 15 % greater than the TAC of that year.

Article 9 states:

The TACs referred to in Chapter II shall be complemented by a system of fishing effort limitation established in Community legislation.

Article 5 states: When the stocks of plaice and sole have been found for two years in succession to have returned to within safe biological limits the Council shall decide on the basis of a proposal from the Commission on the amendment of Articles 4(2) and 4(3) and the amendment of Articles 7, 8 and 9 that will, in the light of the latest scientific advice from the STECF, permit the exploitation of the stocks at a fishing mortality rate compatible with maximum sustainable yield.

In line with Article 5 above, due to the recent ICES assessment of plaice stock status, this plan has changed from being a recovery plan into the second phase of being a management plan.

A total allowable catch (TAC) is determined at an EU level and allocated to Member States on a proportional basis based on historic fishing practices. In the case of this UoC, the UK's MFA allocates Fixed Quota Allocations (FQAs) per vessel based on the quota holding of the vessel. Vessels can also purchase additional quota resulting in a permanent transfer or can lease quota, resulting in a temporary transfer for any given year. This system ensures control on the overall catch levels is retained by each Member State, but provides some flexibility over which vessels catch that allocation.

In addition to total catch from the fishery, a minimum landing size (MLS) of 27cm for plaice is in force and there are numerous technical regulations which define the type of gear, size of mesh and proportion of retained species permitted in given areas with certain gears.

In addition to output controls (quota), input control via effort management measures is also applied to the fishery (under Council Regulations 1954/2003 and 1415/2004)

The UoC is also subject to further restrictions under the Long Term Plan for cod stocks (Council Regulation No 1342/2008), which limits the type of gear that can be used, the number of days fishing permitted with that gear in certain areas of the North Sea, and the amount of cod able to be retained as by-catch.

## **6.6 Monitoring, Control and Surveillance**

EU and national legislation is monitored and enforced by the nation state's Fisheries Agency (NL, UK). It is responsible for enforcement of fishery regulations and collecting information on fishing activity and catches in ports and at sea within the nation states fishery limits and also monitors compliance by the fishing industry.

Within EU member states, the appropriate Fisheries Department applies the EC satellite monitoring requirements (VMS) to track vessels over 15 metres overall length and so discourage misreporting of the location at which fish were taken. Also the fishing effort (days at sea) is monitored by the flag state through the Vessel Monitoring System (VMS). Inspections at sea are carried out by the flag state or the state with national jurisdiction over the area. At sea inspections will examine gear (mesh size), logbooks and content of fish hold are checked.

Vessels over 10m are required to keep logbooks in accordance with EC Regulation No. 2807/83 (and subsequent amendments). Daily log sheets are completed and by agreement are submitted weekly to officers of the nation state – Marine Scotland Compliance or the Marine Fisheries Agency. As flag vessels the UoC can be inspected anywhere by the fishery authorities from their home nation (UK). Whilst fishing in another state's waters they can be inspected by that state's fishery authorities.

Before entering a port a foreign fishing vessel has to notify the local authorities and present information about the quantity and species of fish on board. These quantities are also filled in the

logbook. In case of port inspection weight, size and species of fish are checked against logbook entries. The local authorities will send the original copy of the logbook to the flag state. In case of exceeding of quota the excess quota will be counted against the quota of the country in which the fish is landed.

A Community Fisheries Control Agency has been set up and is based in Spain. This agency has started up a Community Inspection Programme to improve coordination between Member State control agencies. In this Programme a Joint Deployment Programme has been organised in 2007. In this Joint Deployment Programme Fishery Inspectors of different Member States carry out joint inspections at sea. The Joint Deployment Programme has been continued in 2010.

National authorities are also responsible for aggregating national fleet catches to a national total and policing other EC control requirements applicable on landing and as the fish moves through the distribution chain.

Osprey Trawlers have produced a Code of Conduct for MFVs in the UoC (see 6.8), which has been taken into consideration in the assessment process. The Code of Conduct will include various enforcement and control measures that skippers will need to adhere to.

## **6.7 Consultation and Dispute Resolution**

Extensive consultative processes are in place at national and European levels to debate policy, plans and management. Recently more formal procedures have been introduced to incorporate a wider stakeholder community within such consultations.

At a European level, key institutions are the Advisory Committee on Fisheries and Aquaculture (ACFA) -which comprises a contact group at the European level for all stakeholders at national and regional levels – i.e. the North Sea Regional Advisory Council (RAC) – which comprise a contact group dealing with particular fisheries at the regional level.

At a national level, administrations operate formal consultation procedures combining mailings on current issues and proposed changes to management systems and regular scheduled face-to-face meetings with key stakeholders.

At a local level, the UoC vessels are members of the Lowestoft P.O. and the Urk P.O., which both provide a forum for fishermen representation. Lowestoft P.O. is a member of the UK's National Federation of Fishermen's Organisations (NFFO) providing an additional consultative opportunity. The PO also provides a feedback mechanism to the fishermen, for instance by posting information on changes in fishing regulations.

## **6.8 Management of the UoC by the client**

The client has undertaken to develop a 'code of conduct' (UoC Code) that skippers would sign before being accepted into the UoC and prosecuting the certified fishery. The UoC Code will be operational upon certification. This is presented below:

### **Code of Conduct Osprey Trawlers Services**

#### **Introduction**

This Code of Conduct states the rules, schemes and operational practices that MFV in the Osprey Trawlers Services Group must operate to. All ships must comply to these demands in order to maintain their North Sea plaice MSC (sub)certification inside the Group. This Code has been signed by all skippers and owners of the vessels that are member of the Osprey Trawlers Services

Group.

## Objectives

*The objectives of this Code are to:*

**Objective 1** promote the ecologically sustainable development of the North Sea plaice fishery and the sustainable use of living aquatic resources and their environments;

**Objective 2** establish practices, in accordance with the relevant regulations, for responsible fishing, taking into account relevant biological, technological, social, environmental and commercial factors;

**Objective 3** provide standards of conduct for all persons involved in the Osprey Trawlers Group;

**Objective 4** promote best practice in the Osprey Trawlers twin-rigged plaice fishery through appropriate and relevant training

## General principles

The Osprey Trawlers Services Group will:

**Principle 1** strive to conserve and protect aquatic ecosystems;

**Principle 2** minimize the catch of non-target species, the incidental catch of non-utilised species, marine mammals and seabirds;

**Principle 3** comply with all applicable laws and regulations governing their harvest and post-harvest activities;

**Principle 4** strive to implement clean production principles including minimizing any wastage of resource;

**Principle 5** participate in the development and application of selective fishing gear and methods, including those that reduce unwanted by-catch and discards;

**Principle** strive to resolve disputes in a timely and cooperative manner;

**Principle 7** plan, prepare and implement appropriate and relevant training packages for those who work on board of vessels of the Osprey Trawlers Group.

## Specific principles and measures

The signatories of this Code undertake that:

**OTMG 1.** they will establish a procedure for the training of crewmen in the code of conduct, the management system and legal and administrative requirements. Records will to be kept of training;

**OTMG 2.** their vessel is certified to the Responsible Fishing Scheme (RFS) or will be certified to RFS latest in August 2010;

**OTMG 3.** their vessel participates in the fishing for litter scheme (retain material such as derelict fishing gear and other garbage recovered during routine operations for disposal on shore);

**OTMG 4.** their vessel participates in the SFAV scheme (This scheme of the “Stichting Afvalstoffen Visserij” covers the disposal of bilge water, paint, waste diesel, fuel oil, engine oil etc);

**OTMG 5.** their vessel will fish only in ICES subdivision IVb and will stay outside 12 nautical mile limits;

**OTMG 6.** they will respect closed areas in the framework of Natura 2000 when they are implemented (become law);

**OTMG 7.** their vessel will not fish on plaice during the spawning season of plaice and therefore will operate a fishing season that opens on the 1 April and closes on the 15 November;

- OTMG 8.** their vessel will only fish from Monday to Friday. This means that they will not fish (no nets in the water) from Saturday 06:00 AM to Monday 06:00 AM. Other MFV operations are permitted during 06:00 Sat – 06:00 Mon, i.e. steaming to and from fishing grounds.
- OTMG 9.** they will comply with all applicable laws and regulations governing their fishery;
- OTMG 10.** their vessel belongs to a PO and operates under PO rules;
- OTMG 11.** they will only use the prescribed fishing gear needed for the MSC standard as described in this Code (see below);
- OTMG 12.** they will comply with all measures to avoid catches of undersized cod (eg cod avoidance scheme, real time closures (RTC) already operational in England and Scotland):
- OTMG 13.** they will comply with (voluntary) measures to avoid catches of juvenile plaice when operational (Dutch PO plaice RTC scheme)
- OTMG 14.** they if requested will participate, with researchers and managers, in the collection of timely and reliable statistics needed for the conservation and management of fish stocks;
- OTMG 15.** they will conduct trial modifications to the fishing gear to minimize discards;
- OTMG 16.** they will train a crew member on the recognition of PET species;
- OTMG 17.** they will record all interactions with protected, endangered or threatened (PET) species. Where significant impacts are identified they will make a clear plan of action to improve the situation and accordingly amend to this Code;
- OTMG 18.** all their landings will be registered at a fish auction in the Netherlands or the United Kingdom
- OTMG 19.** No member/vessel will be accepted into the group without signing this Code;
- OTMG 20.** they will pay a fine of 2.500 Euro to Osprey Group Ltd in case of a first violation of the measures in this Code;
- OTMG 21.** they will, in case of a second violation of the measures in this Code, lose the right to land MSC certified plaice for a period of one month;
- OTMG 22.** they will, in case of a third violation of the measures in this Code, lose their membership of the Osprey Group and their product can no more be landed as MSC certified fish.
- OTMG 23.** they will annually review the code of conduct to ensure its continued use, applicability and relevance and additional measures may be evoked as the Osprey Trawlers Group deems necessary
- OTMG 24.** amendments and acceptance of new members will be decided on by majority vote.
- OTMG 25.** this Code will be signed annually;

## Prescribed fishing gear

Gear description: Twin rigged otter trawl

Sweeps: 220 m steel wire sweeps with 70 mm rubbers and every 50 m 200 mm rubbers to reduce ground contact

Footrope: between 55 and 70 m covered with 200 mm rubbers:

Mesh size: Either minimum of 95 mm mesh side or minimum of 110 mm mesh size in cod end

Tickler chains: Maximum of 4 tickler chains (max 13 mm chain material)

Clump: weight maximum 1300 kg.

Doors: weight maximum 1200 kg each

Vessel nr and name	Signature Skipper	Signature owner
E104 Ansgar		
PW447 Louwe Senior		
H426 Neeltje		
H357 Good Hope		

### **Implementation and timing**

Osprey Trawler Services Ltd. has developed this Code of Conduct for the unit of certification in the Osprey Trawler Services Ltd. North Sea ICES IVb twin rigged plaice fishery. Osprey Trawler Services Ltd. will undertake preparations for the Code of Conduct during the MSC fishery assessment process. The Code will be implemented at the point of successful MSC certification.'

## 7 ECOSYSTEM CHARACTERISTICS

Marine scientists have studied the North Sea intensively for at least 100 years and, since developed countries border the North Sea, this research has often been at the cutting edge. For example, the development of the scientific theory of fishing in the first half of the 20<sup>th</sup> century was based largely on data from the plaice, cod and herring fisheries operating in the North Sea. Concern over the state of the fisheries was the principal driver behind the development of the International Committee for the Exploration of the Sea (ICES) and this body continues to co-ordinate much of the fisheries research in the north-eastern Atlantic. Pollution has also been an issue in the North Sea due to the proximity of major industrialised centres and the scale of offshore activities such as shipping and oil and gas extraction. Although ICES does undertake some work on pollutants, the main co-ordinator for pollution research has been OSPAR. Recently an ecosystem approach to management has become a policy aim of the European Union (European Marine Strategy). This is leading to a move away from considering activities such as fisheries in isolation towards a stronger emphasis on ecosystem processes and how they are affected by all the relevant anthropogenic activities. The UoC will operate in Area IVb of the North Sea (approx 53.5°N to 57.5°N) so the main focus of the review below is on the central and southern parts of the North Sea.

### 7.1 Ecosystem characteristics

*Habitat and species protection:* The continuing loss of biodiversity is a major cause of concern and modern conservation legislation is principally aimed at reversing this trend in accordance with the Convention on Biological Diversity. In the marine environment this means taking specific protection measures e.g. stopping destructive fishing practices, controlling pollutants etc. and protecting vulnerable habitats e.g. by creating marine protected areas. There is often confusion between marine protected areas and no-take zones but the two are not synonymous e.g. fishing using certain gears might be permitted within an MPA. By the 1990s national governments had designated some inshore sites for protection under international agreements such as RAMSAR (for wetland protection). However protection of marine habitats in Europe has lagged behind protection of terrestrial habitats. A significant cause of confusion is the apparent multitude of conventions and agreements relevant to developing MPA networks in European waters. This has arisen as a result both of the evolution of nature conservation legislation and because of the multi-national jurisdiction of this sea area. For example although most of the North Sea falls within the jurisdiction of member states of the European Union, it also includes waters belonging to non-EU countries such as Norway. There are thus several conventions and agreements which apply to the North Sea as a whole. The conventions and agreements of principal significance for the North Sea are the EU Habitats Directive and the OSPAR Convention.

The EU Habitats Directive introduced in 1992 is designed to protect European biodiversity. Member States are required to propose sites to protect the habitat types listed in Annex I and the species listed in Annex II as Sites of Community Importance (SCI), and if accepted by the procedure described in the Habitats Directive (EEC/92/43) adopted in 1992, designate these sites as Special Areas (SAC). The Habitats Directive lists eight 'open sea and tidal' habitat types as part of the rationale for designating sites of community importance (Annex I habitats 'of community interest whose conservation requires the designation of special areas of conservation'). These are: 1110 Sandbanks which are slightly covered by sea water all the time; 1120 *Posidonia* beds (*Posidonia oceanica*); 1130 Estuaries; 1140 Mudflats and sandflats not covered by seawater at low tide; 1150 \*Coastal lagoons; 1160 Large shallow inlets and bays; 1170 Reefs; 1180 Submarine structures made by leaking gases. An additional marine habitat (sea caves) is in the Natura 2000 Annex I under 'other rocky habitats'. Annex II of the Habitats Directive lists species requiring special conservation, generally because they are vulnerable. For the marine environment this includes species found in the North Sea - harbour seal (*Phoca vitulina*), harbour porpoise (*Phocoena phocoena*) and bottlenose dolphin (*Tursiops truncatus*). The only known group of bottlenose dolphins is in the Moray Firth and unlikely to interact with the UoC fishery. A number of fish species are also listed under Annex II but these are

predominantly marine or anadromous. The SACs together with Special Protection Areas (SPAs), designated under the Birds Directive (2009/147/EC) signed in 2009, form the Natura 2000 network. Implementation of the Directive has proceeded more slowly for the marine environment compared to the land. Nevertheless, national governments are obligated to set up an ecologically coherent network of protected sites by 2012. Although site selection is supposed to take account of inter-connectivity, many of the sites proposed have not considered this aspect. Whether the designated sites really do provide a coherent network is debateable (Johnson et al., 2008). Progress in proposing sites has varied between countries but a number of sites have now been proposed/designated in the North Sea including the Dogger Bank, Cleaver Bank, Sylt outer Reef and Borkum Reef (Nordheim et al. 2006). Once designated national jurisdictions are responsible for drawing up management plans and ensuring that 'favourable conservation status' of the sites is maintained. Article 17 requires Member States to report every six years about the progress made with the implementation of the Habitats Directive. It should be noted that designation of a site under Natura2000 does not automatically mean exclusion of activities such as fishing from the site but the impacts of the existing or proposed activity on the ecological status of the habitat must be evaluated (impact assessment) and action taken if the activities are likely to cause degradation or a declining state. Member states are responsible for issuing site-related protection restrictions – even if these have side effects on fisheries. Under the Common Fisheries Policy, the EU can take measure to support member states in their efforts to protect Natura 2000 sites but this does not relieve the member states of their obligations (Nordheim et al. 2006).

At the broader geographical scale the Convention for the Protection of the Marine Environment of the North-East Atlantic (the "OSPAR Convention") was opened for signature at the Ministerial Meeting of the former Oslo and Paris Commissions in Paris on 22 September 1992. The Convention entered into force on 25 March 1998. It has been ratified by Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Luxembourg, Netherlands, Norway, Portugal, Sweden, Switzerland and the United Kingdom and approved by the European Community and Spain.

OSPAR has established a [list of threatened and/or declining species and habitats](#) in the North-East Atlantic. The list seeks to complement, but not duplicate the work under the EC Habitats and Birds directives and measures under the Berne Convention (Convention on the conservation of European wildlife and habitats), the Bonn Convention (migratory species) and the Ramsar Convention (wetlands) and other relevant instruments. The list of species and habitats was drawn up based upon nominations by Contracting Parties and observers to the Commission of species and habitats that they consider to be priorities for protection. Evidence in support of those nominations has been collectively examined by the OSPAR Commission on the basis of the relevant [Texel/Faial criteria for the identification of species and habitats in need of protection](#) and peer reviewed by the International Council for the Exploration of the Sea (ICES). The list provides an overview of the biodiversity in need of protection in the North-East Atlantic and is being used by the OSPAR Commission to guide the setting priorities for further work on the conservation and protection of marine biodiversity under Annex V of the OSPAR Convention.

Marine protected areas are one measure that signatory countries can take to protect species or habitats identified as requiring protection. At a Ministerial Meeting in Sintra in 1998, OSPAR Ministers agreed to promote the establishment of a network of marine protected areas and following a period of preparatory work, the 2003 OSPAR Ministerial Meeting in Bremen adopted [Recommendation 2003/3 on a network of marine protected areas](#) with the purpose of establishing, together with Natura2000, an ecologically coherent network of well-managed MPAs in the North-East Atlantic by 2010. The recommendation was supported by two sets of guidelines on: (i) identification and selection of MPAs in the OSPAR maritime area (*Reference number 2003-17*), and (ii) management of MPAs in the OSPAR maritime area (*Reference number 2003-18*). Progress on site selection was reviewed in OSPAR Commission (2007). In the North Sea all the nominated sites were reasonably close to shore. They include the Wadden Sea National Park, Eastern German Bight SPA, Essex Estuaries SAC and the North Norfolk coast SAC. Many of the sites overlap or coincide with other designations such as SACs (Special Areas of Conservation – the Habitats Directive). Of the 81 sites submitted by EU Member States by 2006, 78 of them are also Natura 2000 sites. OSPAR has noted that the criteria for selection of sites within the OSPAR network is broader than the selection criteria under Natura2000



so for full compliance with the OSPAR objectives, additional sites would need to be selected. At the time OSPAR noted that substantial further progress on MPA designation and management was required if OSPAR is to be in a position to meet the target of a well managed and ecologically coherent network by 2010.

*Sources of ecosystem data for the North Sea:* General summaries of geography, geology, hydrography, nutrient status, biology, anthropogenic pressures and contaminants of the North Sea can be found in OSPAR (2000) and Rees et al. (2007).

*Bathymetry:* The North Sea is semi-enclosed being partially surrounded by the coasts of the UK and western Europe and Norway. The North Sea is more open in the north but in the south is joined to the Atlantic via a relatively narrow channel, the English Channel. In the east, the North Sea is linked to the Baltic via the Skagerrak and Kattegat. South of the Dogger Bank, the North Sea is generally shallow (< 40 m water depth). From the Dogger Bank northwards water depths vary between 40 to around 100 m but in the Norwegian Trench, to the east, water depths increase to more than 250 m. The general features (bathymetry, seabed type, location of wrecks and underwater obstructions) of the North Sea are well described in marine navigation charts available from the Hydrographic Offices of the UK and other countries bordering the North Sea. Digital bathymetric data are available in vector format from the British Geological Survey (DigBath250). These bathymetries are generally based on discrete sounding data, rather than continuous mapping but, fishing vessels can contribute to improving available bathymetry by submitting sounder data to the OLEX system ([www.oceandtm.com](http://www.oceandtm.com)).

*Oceanography:* The main inflow to the North Sea occurs along the western slope of the Norwegian Trench but significant inflows are also found through the Faroe-Shetland channel. Overall less than 10% of the total inflow to the North Sea comes via the English Channel as the flow rates are constrained by the relatively narrow Dover Straits. Just north of the Dogger Bank, the Flamborough Front (a front is a narrow zone where the seawater conditions such as temperature or salinity change rapidly) marks a transition from waters which are generally well mixed throughout the year, in the south, to seasonally thermally stratified water to the north (OSPAR, 2000). Although the waters of the southern North Sea are generally vertically mixed, horizontal salinity fronts are a feature in areas of riverine inflow (Munk et al., 2009; OSPAR, 2000). The strong tidal residual and wind driven flows in the southern North Sea are highly relevant for plaice as they carry eggs and larvae from the main spawning grounds in the Southern Bight (Taylor et al., 2007) towards suitable nursery grounds along the coasts of Germany and the Netherlands. Inter-annual variability in this flow has been suggested to be an important factor affecting the numbers of settling plaice arriving at the nursery grounds (Bolle et al., 2009; van der Veer, 1998).

*Seabed type:* The southern North Sea has been a busy shipping area for hundreds of years and before the era of electronic position fixing, the characteristics of seabed samples recovered using sounding lines were a useful aid to navigation, especially at times of low visibility in shallow waters. The general seabed characteristics of the southern North Sea have therefore been recorded on navigation charts for at least 200 years. North Sea sediment types and morphology are therefore well characterized at the broad scale (Pantin, 1991, Eisma, 1981). Digital compiled seabed sediment data for the UK sector of the southern North Sea are available from the British Geological Survey (DigSBS250). Sediments in Area IVb are mainly sand or muddy sand with patchy coarse sand and gravel deposits adjacent to the coasts. Areas of clay, clay gravel and softer muds are also found in some areas e.g. just east of the Dogger Bank. In addition, there is significant re-suspension and transport of sediments in the southern North Sea as a result of the strong tidal flows in the area and storm events. The East Anglian coast is currently particularly subject to erosion with significant amounts of cut-back occurring, especially after winter storms. Sediment re-suspension and transport is principally of interest from the perspective of land and seabed erosion and deposition but also affects ecologically relevant parameters such as water transparency (Lee and Folkard, 1969).

*Plankton:* Remote sensing data are readily available for the North Sea (Ruddick et al., 2008) and can

be used to estimate surface chlorophyll levels although conversion of satellite colour to chlorophyll equivalence is complicated, particularly in the southern regions, by the optical complexity of the waters found in the southern North Sea (McQuatters-Gollop et al., 2007). Based on the colour index (the colour index is a scoring of the greenness of the silk sections from the continuous plankton recorders, the index has been shown to correlate significantly with chlorophyll concentrations) of the Continuous Plankton Recorder program ([www.sahfos.ac.uk](http://www.sahfos.ac.uk)), phytoplankton in the North Sea follow a typical temperate mid-latitude pattern being low in winter followed by a spring bloom, a decline in summer and a second autumnal bloom, at least up until the mid 1980s. Since then the 'classical' pattern has changed somewhat with a less obvious summer decline in chlorophyll levels (Reid et al., 1998). This may be related to a broader regime change in the North Sea food-web around this time that is the subject of continuing research (McQuatters-Gollop et al., 2007; Kirby & Beaugrand, 2009). Examining transects across the Dogger Bank also shows that significant amounts of primary production occur just above the thermocline in summer so satellite derived estimates probably underestimate overall annual production (Weston et al., 2005). North Sea zooplankton are also monitored on a monthly basis by the Continuous Plankton Recorder program and the data fed into an annual status report, into various ICES Expert Groups and used in scientific research. Additional monitoring of phytoplankton, zooplankton and Harmful Algal Blooms takes place in coastal waters by national institutes under the EU Water Framework Directive. Around the coast there are a number of long-running time-series monitoring various parameters including water temperature, salinity, phytoplankton and zooplankton. These include the Helgoland Roads station (Germany), Dove station (off NE coast of UK) and Stonehaven (off Scottish east coast). There is however no regular long-term monitoring of plankton at offshore sites other than by the CPR. Broad-scale estimates of zooplankton abundance and production have usually been inferred from CPR data (Heath 2005) but this is complicated due to the sampling characteristics of the CPR (Pitois & Fox 2006).

*Benthos*: The North Sea has been periodically surveyed for benthos but monitoring is not as frequent as for commercial fish. Major co-ordinated surveys were conducted in 1986 and between 1998 and 2002 under the auspices of ICES. Up until 2008 ICES had a specific study group on North Sea Benthos (Study Group on the North Sea Benthos, SGNSB) whose work led to a major review of the structure and functioning of the North Sea benthos (published as an ICES Co-operative Research Report - Rees et al. 2007). Multivariate analysis of the macrobenthic species showed assemblages that correspond well with sediment types. Large differences in the macro-zoobenthos species assemblages were found between the deeper northern and shallower southern parts of the North Sea with the separation of assemblages coinciding with the Frisian Front at a depth of approximately 30 m and at the northern lower slope margin of the Dogger Bank. On the Dogger Bank itself, and to the south and east of the bank, communities typical of muddy-gravel, muddy-sand and sand sediments dominated. Typical dominant species included *Spiophanes bombyx* (bivalve mollusc), *Amphiura filiformis* (brittlestar), *Mysella bidentata* (bivalve mollusc), *Corbula gibba* (bivalve mollusc), *Magelona johnstoni* (bristleworm) and *Urothoe poseidonis* (amphipod). Comparing the infaunal communities found in 1998-2002 with data from 1986, Rees et al., (2007) concluded that the community structure in the central Oyster Ground had remained rather stable over time, but a decrease in total abundance was found at some stations. Also, the Dogger Bank community remained rather stable, even though the abundance of the polychaetes *O. borealis* and *Nephtys cirrosa* and the bivalve *Abra prismatica* had decreased. At the Tail End, abundances of *L. conchilega* and *S. bombyx* had increased, while at the South West Patch *Magelona* spp. and *S. bombyx* increased but *Bathyporeia* spp. decreased. However it must be noted that levels of beam trawling activity in the southern North Sea had increased steadily during the 20<sup>th</sup> century (Frid et al., 2000; Smit, 2001) and the communities observed in 1986 would likely have been altered by this disturbance.

The SGNSB also recommended that a further synoptic survey should be conducted in the North Sea in 2010. After the scientific re-organisation of ICES designed to strengthen support for the ecosystem approach, the remit of SGNSB was moved to the new 'Study Group on Climate related Benthic processes in the North Sea (SGCBNS)' who will be developing their science program during 2010. The synoptic survey originally planned for 2010 has therefore not yet taken place. Various searchable national datasets are available e.g. the UK Data Archive for Seabed Species and Habitats

(<http://www.dassh.ac.uk/SEABED>) but data records offshore tend to be patchy and incomplete. Data from national databases are fed into the European Ocean Biogeographic Information System (<http://www.marbef.org/data/eurobissearch.php>) where spatial coverage tends to be more complete.

*Fish:* The main source of data on the status of North Sea fish stocks comes from the formal stock assessments conducted by ICES. The latest advice is available at [www.ices.dk](http://www.ices.dk) but these assessments only cover the main commercial species. As well as commercial landings data the assessments use data from research surveys. Since the 1960s the main research vessel surveys have been co-ordinated by the International Bottom Trawl Surveys Working Group. Under the IBTS survey methods and gear are standardized between participating countries with the aim of producing comparable data. As well as summary maps, the North Sea IBTS survey data can be accessed from the DATRAS server at ICES. Catches of non-commercial species are also recorded so these data have been used in many research projects, for example to examine changes in fish distributions (Perry et al., 2005). It must be noted however that the gear does not catch all species equally and major corrections are needed if the data are used to estimate biodiversity indices (Fraser et al., 2008). The fish community complex in the southern North Sea (south of the Flamborough Front) is typical of shallow sandy-mud habitats, species found here include dab, grey gurnard, plaice and sandeel. Historically cod, whiting were also abundant but their numbers are currently much reduced in this area. In the central North Sea (Flamborough Front to Shetland Islands) gadoids tend to be more common, species such as haddock, whiting and cod. In the deeper northern waters species such as saithe, haddock and Norway pout tend to dominate. Pelagic species such as sprat, herring and mackerel are found throughout the North Sea exhibiting seasonal migrations between breeding and feeding grounds. The present fish communities, their relative abundance and distribution have undoubtedly been significantly altered by over a century of intense fishing pressure (Thursten et al., 2010) but environmental changes are also contributing (Dulvy et al. 2008, Perry et al. 2005).

*Marine mammals:* Seal populations in the North Sea are monitored by a variety of organisations. Between Norway, Iceland, Greenland and the Faroe Islands, co-ordination is provided by the North Atlantic Marine Mammal Commission. In the UK, the NERC Sea Mammal Research Unit (SMRU) undertakes regular assessments of the stock status of seals around UK coasts with additional co-ordination from statutory conservation agencies. The levels of by-catch in UK fisheries are monitored by Marine Scotland (formerly Fisheries Research Service) but un-reported mortalities undoubtedly occur. These data are presented annually to the Special Committee on Seals. Of general concern in the North Sea are recent outbreaks of seal distemper (phocine distemper virus) and related viral outbreaks (Härkönen et al. 2006). In the Wadden Sea, numbers of harbour seals (*Phoca vitulina*) and grey seals (*Halichoerus grypus*) are monitored annually by aerial survey (Reijnders et al. 2006). The latest estimate indicates the population of harbour seals in the Wadden Sea has recovered to its pre 2002-epizootic level of around 18,000 animals (Trilateral Seal Expert Group 2008). In Danish waters, the Danish National Environment Research Institute is responsible for monitoring population trends. Numbers of grey seals are monitored periodically along the Norwegian coast. Although Dogger Bank has been notified as being an important area for both harbour and grey seals by the Netherlands government, it is recognised, on the basis of satellite tracking, that these animals range widely within the southern North Sea (Jak et al., 2009).

The broad-scale distributions of cetaceans in the North Sea are available in Reid et al. (2003) but recent, comprehensive population assessments for North Sea cetaceans are lacking. A major international program (SCANS-II [biology.st-andrews.ac.uk/scans2/](http://biology.st-andrews.ac.uk/scans2/)) estimated numbers of harbour porpoises and small cetaceans in the North Sea and adjacent waters in 1994. A new project, Cetacean Offshore Distribution and Abundance (CODA) began in January 2007 but the focus is the offshore waters to the west of UK, Ireland, France and Spain. Local groups of cetaceans within the North Sea, such as the Moray Firth dolphins, are monitored intensively through University research and volunteer observer programs ([www.earthwatch.org/expeditions/robinson.html](http://www.earthwatch.org/expeditions/robinson.html)). Several volunteer groups also run programs in the wider North Sea utilising ferries ([www.orcaweb.org.uk/index.html](http://www.orcaweb.org.uk/index.html)). Conservation of small cetaceans in the North Sea comes under the "Agreement on the Conservation of Small Cetaceans of the Baltic, North East Atlantic, Irish and North Seas" which is an extension of the

original Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS) signed in 1991. ASCOBANS oversees a number of activities relevant to fisheries management in the North Sea, for example developing the 'Conservation Plan for Harbour Porpoises in the North Sea'.

Harbour porpoise are of particular interest as they are one of the species falling under the EU Habitats Directive. The Dutch government evaluates the current population status of harbour porpoises (*Phocoena phocoena*) in its EEZ as 'unfavourable-bad' to 'unfavourable-inadequate'. However, as for the seals, it is recognised that the nominated offshore Natura2000 sites do not necessarily serve any special purpose for these species and that their conservation needs to be managed on a wider North Sea basis (Jak et al., 2009).

*Seabirds:* The broad distribution of seabirds in the North Sea is available in Stone et al. (1995). Monitoring of seabirds in the North Sea is undertaken by a variety of organisations. These include the Seabirds at Sea Unit of the UK Joint Committee on Nature Conservation (JNCC). In the Dutch sector, seabird densities are recorded bi-monthly by using airborne strip-transect monitoring (Pebesma et al. 2005). Seabird data collected in north-west Europe are collated into a shared database managed by the JNCC on behalf of the European Seabirds at Sea Database Co-ordinating Group (ESAS). A web portal for accessing both seabird and cetacean data is available at [www.seamap.env.duke.edu/](http://www.seamap.env.duke.edu/). Current issues in the North Sea include several recent years of reduced breeding success for species such as guillemot (*Uria aalge*) (JNCC, 2008a; Mavor et al., 2005). These breeding failures have been linked to food shortages, particularly of sandeels (*Ammodytes* sp.). However there are several hypotheses as to why sandeel stocks should have declined so severely in the North Sea including changes in the plankton which the sandeels feed on and increases in the abundance of herring (*Clupea harengus*) which also predate on the sandeel (Frederiksen et al., 2007). Direct impacts of fisheries are not thought to be responsible for the recent decline as fisheries within foraging range of breeding colonies have been controlled. Many of the major seabird colonies are on the Scottish coast and most of the research on their breeding success has been focussed in the northern North Sea. The southern North Sea is however important for species such as great skua (*Stercorarius skua/Catharacta skua*), great black-backed gull (*Larus marinus*), common guillemot and lesser black-backed gull (*Larus fuscus intermedius*) (Jak et al., 2009).

*Endangered, threatened and protected species:* Under the MSC definition of ETP species only those covered by national legislation or international binding agreements are included. For the North Sea this includes species listed under CITES Appendices I, II or III and OSPAR List of Threatened and/or Declining Species and Habitats (Reference Number: 2008-6). Animals on the IUCN Redlist but not included under CITES or OSPAR are dealt with under the Retained or By-catch Species components of this report. The CITES list for the UK, Netherlands and Germany include many cetacean species including harbour porpoise (*Phocoena phocoena*). There are likely to be very few interactions of the UoC with any of these species, the UoC were verbally questioned as to whether they had ever caught any marine mammals, the answer was negative. Basking shark (*Cetorhinus maximus*) are also listed but are predominantly found to the west of the UK, there have been occasional records from the northern North Sea

The OSPAR list for Region II (Greater North Sea) includes fish, birds and invertebrates. The UoC twin-rig otter trawl fishery will not have impacts on seabirds foraging in the area as it does not catch sandeel, the mesh size used is too large to retain this species. OSPAR listed fish include *Acipenser sturio* (sturgeon); *Alosa alosa* (Allis shad); *Anguilla anguilla* (Common eel); *Centrophorus granulosus* (Leafscale gulper shark); *Cetorhinus maximus* (Basking shark); *Coregonus lavaretus oxyrinchus* (Houting); *Dipturus batis* (Common skate); *Raja montagui* (Spotted ray); *Gadus morhua* (Cod); *Hippocampus guttulatus* (long-nosed seahorse); *Hippocampus hippocampus* (Short-nosed seahorse); *Lamna nasus* (Porbeagle); *Petromyzon marinus* (Sea lamprey); *Raja clavata* (Thornback ray); *Rostroraja alba* (White skate); *Salmo salar* (Salmon); *Squalus acanthias* (Spurdog); *Squatina squatina* (Angel shark). There are unlikely to be significant interactions with any of the deeper-water sharks or anadromous species listed. Interactions with cod have been dealt with under retained species

rather than ETP in this report. The UoC catches rays but in rather small amounts. At present a species breakdown of the rays caught is not available but this will be generated. Of the listed ray species only spotted and thornback ray occur commonly in the southern North Sea. There are occasional records of spurdog (*Squalus acanthias*) from the southern North Sea but it is now more associated with waters to the west of the UK (EurOBIS). Catches of spurdog in the International Bottom Trawl survey in the North Sea have been low since at least the 1970s (Hessen and Daan 1996) although at the beginning of the 20th century anecdotal evidence suggests it was much more common in the North Sea (<http://www.ices.dk/marineworld/fishmap/ices/pdf/spurdog.pdf>). The invertebrates listed include *Arctica islandica*, *Nucella lapillus* and *Ostrea edulis*. Ocean quahog (*Arctica islandica*) are found more generally to the south-east, around the Oyster Ground (EurOBIS). *A. islandica* lives in a variety of fine grained sediment types just buried beneath the sediment-water interface. Although ocean quahog are relatively robust, they are thought to be vulnerable to damage by heavy fishing gear such as beam trawls and it has been reported that densities of ocean quahog in the heavily fished areas of the southern North Sea are much lower when compared with the less intensively fished Fladen Ground. The dogwhelk, *Nucella lapillus* is mainly found in shallower waters close to the coast. There are a few records of this species around the southern edge of the Dogger Bank (EurOBIS). Their population decline was probably caused by the use of TBT based anti-foulants on ship hulls which can lead to imposex in molluscs, as discussed in relation to the decline of the more widely distributed offshore species, the common whelk (*Buccinum undatum*) (ten Hallers-Tjabbes et al. 1996, Kaiser 1998). The UoC is unlikely to affect the population status of *Nucella lapillus* due to the distribution of this species. Stock abundance of *Ostrea edulis* in the North Sea was probably greatest in the 18th and 19th centuries, when there were large offshore oyster grounds in the southern North Sea and the Channel. Population decline was probably caused by over-exploitation but their present status is also affected by the spread of the Pacific oyster (*Crassostrea gigas*), by disease and by increasing sea temperatures. Current records (EurOBIS) show it is now uncommon offshore in the southern North Sea. The UK Biodiversity Action Plan on Native Oysters principally concentrates on maintaining the remnant inshore populations, particularly along the western coast of the UK.

*Integrated monitoring:* There are regular monitoring programs for most ecosystem components (pollutants, plankton, fish, seabirds, marine mammals) although these are often conducted at different spatial and temporal scales. Co-ordination of monitoring is generally through OSPAR and ICES although the European Union has sought to increase integration of North Sea marine science through various Framework programs and networks such as EurOceans ([www.eur-oceans.eu](http://www.eur-oceans.eu)). Within Europe there are increasing efforts to co-ordinate monitoring data to facilitate regional scale evaluations of ecosystem health. However we are still some way from having all data available from easy-to-use web based sources and considerable effort is needed to compile data for regional assessments e.g. the ICES REGNS project. Availability of data varies nationally with some of the best examples e.g. Mapping European Seabed Habitats project (<http://www.searchmesh.net/>) only covering a portion of the North Sea. In 2001 a comprehensive evaluation of North Sea monitoring and research was undertaken by the German Centre for Sea Research and Climate under the SYCON project (Various, 2001). This comprehensive review still provides an excellent summary of what is known about the North Sea ecosystem. In 2006, ICES conducted a pilot study on integrating ecosystem indicators in the North Sea (ICES Regional Ecosystem Study Group for the North Sea) with a view to establishing a regular ecosystem status assessment. Monitoring is also co-ordinated through NOOS (North Sea Ocean Observing System; [www.noos.cc/](http://www.noos.cc/)) which is a component of GOOS (Global Ocean Observing System). Quarterly reports linking oceanographic conditions and fisheries were produced by ICES as part of the North Sea Pilot Project (NORSEPP) but this activity ceased in 2008.

*Oceanographic and coupled physical-biological models:* A range of oceanographic models have been developed for the North Sea e.g. HAMSOM and POLCOMS. Several of these have been coupled with particle tracking schemes and have been used to predict the dispersal paths of passive tracers such as pollutants and fish eggs (Heath and Gallego, 1998). Some of these physical models have also been coupled to biological models of varying complexity (e.g. ECOHAM, ERSEM). These models can be used to explore the interactions between natural ecosystem variability, biology and anthropogenic activities. Daewal et al. (2008) used this type of coupled model to explore the growth of sprat larvae in

the German Bight whilst Blackford & Gilbert (2006) used a similar coupled model to examine how pH (ocean acidification) might vary in the North Sea in the future. Because of their complexity these models are generally only available in marine institutes and universities although there is increasing interest in running operational models of the North Sea and facilitating access to the outputs via the internet. Most of these models only include representations of the lower trophic levels (phytoplankton and in some cases zooplankton).

*Foodweb models:* As mentioned above, trophic levels above the zooplankton have usually not been explicitly represented in coupled physics-biological models of the North Sea. The higher trophic levels have however been included in mass-balance models such as Mackinson (2001), an ECOPATH reconstruction of the possible foodweb before heavy fishing. This model has recently been upgraded to include spatial representation (Mackinson & Daskalov, 2007). The ICES Working Group on Multispecies Assessment Methods have recently begun work on comparing results from North Sea Ecopath with Ecosim (EwE) models with results from multi-species virtual population assessment (MSVPA). With regard to plaice, which generally show low inter-action with other fish species this is unlikely to lead to substantial revisions in the perception of energy flows to or from this species. Plaice were also included as a key component in the demersal benthivore guild in the food web analyses of Greenstreet et al. (1997) and Heath (2005).

*Habitats:* Development of offshore protected areas under the EU Birds Directive and Habitats Directive has lagged progress on land but the pace of progress in nominating sites has recently picked up. Of particular relevance to the UoC is the Dogger Bank. The UK, Dutch and German governments have, or will, all notify this area as being important on the basis of habitat ‘Sandbanks covered all the time’. In addition, the UK has provided evidence that the Dogger Bank is of importance for harbour porpoise whilst the Dutch government has included grey and common seals in addition. Other sites within Area IVb may be nominated as the Natura2000 process proceeds.

The general distribution of habitats in Area IVb are broadly known but more detailed studies are currently being conducted by national governments undertaking the process of identifying offshore Special Areas for Conservation (SACs) and Special Protection areas (SPAs) under the EU Habitats and Birds Directives. In addition, under the recent Marine and Coastal Access Act (2009), the UK government has the power to designate further sites (Marine Conservation Zones). Eventually all these sites will build into an ecologically coherent network of protected areas, the Natura 2000 network. Detailed sidescan sonar mapping of many parts of the North Sea has been conducted, particularly in relation to oil and gas exploration, dredging operations and more recently the development of offshore wind-farms but these data are usually commercially sensitive and are not widely available. The need for more comprehensive mapping and habitat classification of the North Sea was recognised by the 5<sup>th</sup> North Sea Ministerial Declaration as an essential component of marine habitat classification and the ministers specifically encouraged OSPAR and the European Environment Agency (EEA) to start marine habitat mapping of the North Sea by 2003 (as required for OSPAR’s Biodiversity Committee’s programme to map the distribution of 14 priority habitats across the OSPAR north-east Atlantic region). Information on the geographic distribution of particularly vulnerable habitats is being gathered via many national programs but co-ordination is still problematic. Mapping sensitive habitats in the North Sea is co-ordinated through OSPAR’s Marine protected Areas Species and Habitats. At a European level, the project Mapping European Seabed Habitats (MESH, 2004-2008) aimed to provide a unified portal to access such data. Despite these efforts, a single point-source for collated, quality controlled seabed habitat data covering the whole southern North Sea is still not readily available. In particular data for non-UK parts of Area IVb are not included in MESH.

## **7.2 By-catch and discarding**

Concern about lack of data on by-catch and discards in the southern North Sea flatfish fisheries has led to the establishment of discard sampling schemes run by the national fisheries agencies. In general

two approaches have been used. Observers may be placed on boats and this is probably the preferred approach since it helps ensure consistency in the data. The disadvantage is the relatively high cost of placing observers on vessels and the subsequent limited coverage attained – especially when coverage of several metiers is needed. An alternative approach is to provide the fishers with guidance and assistance in self-sampling. Under the current Netherlands self-sampling scheme, fishers return the complete catch (minus the retained species) from one or two hauls per trip to IMARES where the by-catch is sorted, identified and measured. Both fish and benthos are analysed but IMARES currently only has staff capacity to deal with a limited number of self-sampling returns. In 2009, 6 vessels took part in the scheme and in 2010 this will be increased to around 20. Because the twin-rig plaice fishery has developed relatively recently, by-catch and discard data from this specific fishery are currently limited (both IMARES and Cefas were asked if they had by-catch and discard data available for this fishery). Discard data are available from PW447 collected in 2007-2008 but only for plaice and cod. Plaice discards are dealt with under section 4.4. Regarding cod, the data in Table 2 show that cod are caught but that there were no cod discards in 2007-2008 although these data were collected using a 110 mm mesh.

As no specific discard trials have been reported for the UoC gear likely levels must be inferred from other studies conducted in the North Sea, Baltic and Barents Sea. van Keeken et al., (2004b) provides some data comparing discarding of fish in a limited number of trips on North Sea twin-rig trawlers (Table 4). Mesh size for the twin riggers was 95 – 100 mm. The results show low levels of discarding per unit time in the twin-riggers for sole, cod and whiting, but higher levels of plaice, grey gurnard, dab.

**Table 4 Number of fish discarded per hour in the twin rig fishery in 2001, 2002 and 2003 for most commons species**

Species	2001	2002	2003
Dab	458	32	665
Plaice	464	108	418
Sole	0	0	0
Cod	2	<1	<1
Whiting	9	2	50
Grey Gurnard	203	7	195
Total	1136	150	1329

(source: van Keeken et al., 2004b)

Rough estimates of the absolute discard levels for plaice, cod and whiting by the 4 vessels in the UoC have been made assuming 16h fishing per week per vessel over a maximum of 30 weeks. Table 4a shows the results together with the numbers discarded estimated by the ICES WGNSSK for all fishing fleets in the North Sea (ICES 2009b). The levels of discards are not insignificant but are very small compared with the total level of discarding by all fleets and the estimates of stock abundance of 1 and 2 yr olds which make up the bulk of the discarded fish.

Table 4a. Estimates of the absolute numbers of fish discarded by the four vessels of the UoC in a year, assuming 30 weeks fishing by each vessel per year and 16 h fishing per week's trip. The results are based on a single vessel and extrapolated to the rest of the fleet.

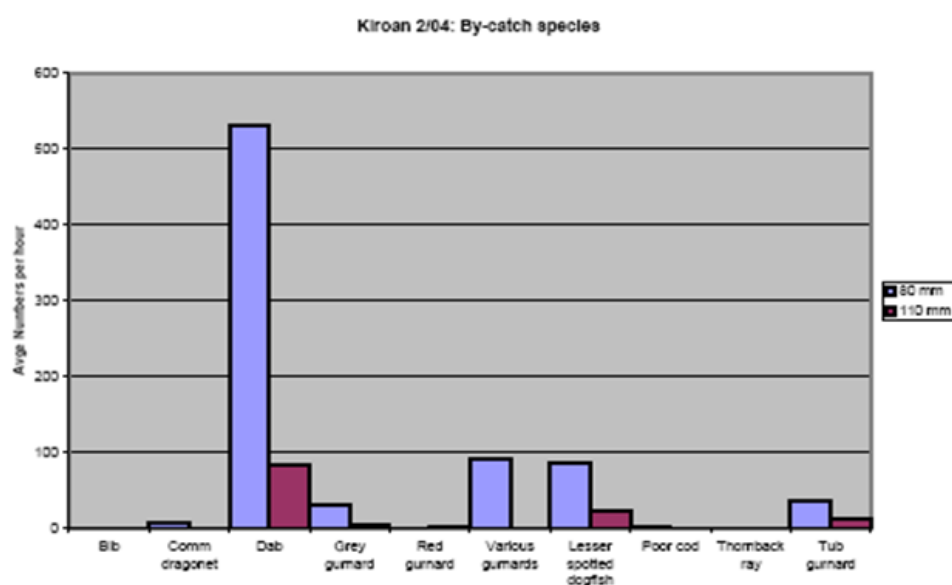
	Discards by UoC (x1000s))	Discards by all fleets (x1000s)	Stock Nos at age 1 + 2 (x1000s)
plaice	2851	409000	857000
cod	9	31000	91000
whiting	176	54000	607000

(note: fleet discards are total all ages averaged for 2007 and 2008; Stock nos are ages 1 and 2 averaged for 2007 and 2008.)



Data on catches and discards are also available from a recent UK fisheries science partnership projects which compared 80mm, 110mm and 120mm mesh otter trawls on catches of plaice, sole, cod and other species in the Irish Sea (Cotter et al., 2004a) and from fisheries science partnership projects in the North Sea using 120 mm twin-rig trawls (Cotter et al., 2004b). They concluded that discard rates of plaice and cod were low in the 120mm mesh trawl but were unable to show a statistically significant effect of variants in the twin-rigs (comparing 100mm and 120mm cod ends; with/without square mesh panels of 90mm and 100mm; and with/without tickler chains). The largest effect of reducing the mesh from 110 to 80 mm was on the amount of dab discarded (Figure 12) Horwood et al, (2006) reported cod discards of 14% by weight from the 100mm mesh otter trawl fleet in the North Sea.

Levels of discarding in any specific fishery are the result of a combination of the size range of fish selected by the gear, the distribution of fish of different sizes and technical measures in force such as minimum landing size or commercial value of fish of different sizes. Two main methods have been used to study net selection in the field. Firstly the cod-end may be covered with a finer outer net and the fish retained in this compared with the fish retained in the cod-end itself. This has the advantage of comparing catch and escapes from the same group of fish entering the net but the cod-end cover may affect water flows and alter the net's overall fishing characteristics. Secondly, catches in paired hauls may be made. This approach has been applied with twin-rig designs, one net acting as the control and the other being designed to test the factor being investigated. Compared with the covered net approach, the advantage of this approach is that the fishing characteristics of the net should not be affected. The disadvantage is that considerable numbers of comparative hauls are required to gain statistical power given the high variance normally found between replicated catches (Cotter et al., 2004b).



**Figure 12 comparison of catch of non-commercial species using 80mm and 110mm trawls from the eastern Irish Sea**

(Source: Cotter et al., 2004a).

Because net selectivity is affected by the complex interactions of fish size, behaviour, shape and condition and net mesh size, twine types and net design, an individual-based modelling tool (PRESEMO) has recently been developed (O'Neill and Hermann, 2007). Runs of this model suggest that the  $L_{50}$  (the length of fish where 50% entering the net are retained) for gadoids such as haddock will range from about 25-35 cm with a mode around 31 cm for 100 mm cod-ends. Thus 100 mm mesh nets (and therefore also smaller nets) are likely to retain more than 50% of under MLS cod if they are present in the area and enter the net (the current North Sea MLS for cod 35 cm). It is important to note that the PRESEMO model was calibrated using haddock data and that retention of cod may vary in



comparison and that some differences in retention curves are predicted when other parameters such as twine thickness are varied, these differences are however relatively minor compared with changes in mesh size. In discussing the need for effort reductions in the North Sea cod fishery, Horwood et al. (2006) concluded that a mesh size of around 150 mm would be needed to avoid catching juvenile cod. Using either 110-130 mm or 95-110 mm mesh nets, there is a potential for under-sized cod to be caught by the UoC. Countering this, the UoC twin-rig design has a low head-line which is designed to reduce the amount of cod caught. The UoC do not wish to catch too much cod as this will affect their days-at-sea. The overall amount of cod landed by the UoC is relatively low so the levels of discarded cod should also be relatively small but given the current conservation status of cod, especially in the southern North Sea, cod discarding by the UoC will need to be carefully monitored.

Slippage is not a problem in this fishery. Here, we define the term slippage as the act of discarding fish before sorting, i.e. the catch or the proportion of the catch not brought on board and sorted. We define high-grading as the discarding of catch which is above the minimum landing size in favour of retention of other parts of the catch which will be more valuable at market. High-grading can occur when fisheries operate under restrictive quotas. The assessment team were told verbally that In this fishery all catches are brought on-board and all catch above the minimum landing sizes for which there is quota are brought to market.

Around the Dogger Bank, thornback ray (*Raja clavata*) have been selected as characteristic of the habitat type Sandy banks (Jak et al., 2009). Thornback rays were once fairly common on the Dogger Bank and in the wider southern North Sea but their abundance is now much reduced. Reliable population estimates for elasmobranchs in the North Sea are not readily available although some idea of population trends may be obtained from the time series of catches in the IBTS research trawl timeseries. The UoC may take occasional thornback rays although landing data presented in Table 2 show only small amounts of skate and rays are retained overall. Spurdog have not been that common in the North Sea since at least the 1970s but were apparently much more common at the beginning of the 20<sup>th</sup> century. Landings and discards of elasmobranchs by species will require monitoring and if possible the impacts evaluated against available population trends.

There seems to be relatively little published data on discard levels of benthos in twin-rig fisheries in the North Sea. Some data are provided in van Keeken et al. (2004b) (Table 5). There are no data on whether *Arctica islandica* or *Ostrea edulis* would be damaged by lighter twin-rig otter trawls.

**Table 5 Number of bottom animals discarded per hour in the twin rig and beam trawl fishery in 2002 and 2003**

Species	2002		2003	
	Twinrig	Beamtrawl	Twinrig	Beamtrawl
Starfish ( <i>Asterias rubens</i> )	51	496	136	1130
Sand star	2	409	272	2064
Brittle star	<1	821	2	867
Swimming crab	17	555	44	361
Spider crab	<1	206	7	537
Hermit crab	2	316	6	100
Heart urchin	0	154	12	164
Total	74	2957	479	5223

Source: van Keeken et al, 2004

Anecdotal evidence presented by Osprey Trawlers to the audit team suggests that benthos by-catch in the >110 mm mesh was very limited. The catches were described as 'clean'. With the 95-110 mm mesh a bit more benthos will be caught. However, the net is rigged in Danish fashion, this was explained as the net being mounted above the rubbers and since there are gaps between the rubbers this allows benthos to pass under the net, rather than into it. Osprey Trawlers also emphasised that the quality of their catch (and hence price achieved) is reduced if benthos are caught so there is active

motivation to reduce benthos by-catch as much as possible. Other considerations are that the net is light polyethylene and will rip if excessive amounts of benthos or boulders are caught.

Unobserved fishing mortality occurs when animals are damaged by the passage of the gear or escape from the net but are damaged or stressed and subsequently die (Kaiser 1998, Ryer 2004). Unobserved mortality has also been inferred from studies of scavengers moving into trawled areas (Kaiser & Spencer 1994, Ramsay et al. 1996, Kaiser & Ramsay 1997; Bergman & van Santbrink 2000, Groenewold & Fonds 2000, Kenchington et al. 2006). Some experimental work has been undertaken on survival of fish following capture by otter trawl gears (Ryer 2004, van Beek et al. 1990, van Keeken et al. 2004b) but direct studies on unobserved mortality are almost totally lacking due to the technical difficulties in conducting such work underwater. Post-capture mortality of other benthic organisms has been studied by monitoring their survival in seawater tanks on board fishing or research vessels (Van Beek et al. 1990). Most of this research has been conducted in relation to the beam trawl fisheries (Kaiser & Spencer 1995, Kaiser & Ramsay 1997) but van Keeken et al. (2004b) included a study on post-catch survival of plaice in twin-rig fisheries. Despite less apparent damage to the fish in the twin-rig, survival rates were similar. Experiments showed that, on average, only 8% of the discards survived more than 60 h, in both the twin trawl and beam trawl fishery. The authors concluded that, even in the otter trawl, the fish had suffered enough internal damage to lead to high levels of mortality.

### **7.3 Ecosystem impacts**

The North Sea has been subjected to increasing levels of fishing during the 20<sup>th</sup> century and as a result is definitely disturbed (Hiddink et al., 2006). The composition of the fleets has also changed over time. Up to the 1960, otter trawling was the most common method but after that beam trawling increased dramatically (Philippart 1998). Recently the levels of beam trawling have begun to decline, mainly in response to increased fuel prices. Changes in fuel price have also affected the spatial distribution of the fleets with the remaining beamers now apparently fishing closer to port than previously. Most recent debate has concerned the extent to which trawling disturbance has impacted the ecosystem function of the North Sea taking account of the natural background levels of disturbance caused by tides and storms. Again the impacts of beam trawling have generally dominated analyses since there is often a significant lag between scientific research and the current fleet situation. Trawling of all types typically reduces the surface roughness of the seabed by removing larger epifauna and by resorting sediments (Hall 1994, Schwinghamer et al. 1996) but the depth and magnitude of disturbance vary greatly with gear type (Kaiser et al. 2006).

It is now well established that trawling alters the structure and biota of the benthos (Collie et al. 2000, Kaiser 1998, Kaiser & de Groot, 2000, Jennings et al. 2001, Trimmer et al. 2005, Hiddink et al. 2006, Hinz et al. 2008). Gear directly affects the seabed by scraping or ploughing, re-suspending sediment, physically destroying bed-forms, and removing, scattering or damaging non-target benthos. However, the precise nature of the impacts varies with the intensity of fishing (Jennings et al. 1999), gear type (Hall, 1994), sediment characteristics (Kaiser et al. 1998) and degree of natural disturbance (Jones 1992, Hall 1994, Kaiser 1998). As expected, negative impacts of trawling are greatest in areas not subject to high levels of natural disturbance (Hiddink et al. 2006). Trawling principally affects benthic macrofauna (both infauna and epifauna), while smaller-bodied infauna tend to be less vulnerable (Bergman & van Santbrink 2000, Jennings et al. 2002). Organisms may also be damaged by trawling and subsequently scavenged by other organisms (Kaiser & Spencer 1994, Ramsay et al. 1996, Kaiser & Ramsay 1997, Bergman & van Santbrink 2000, Groenewold & Fonds 2000, Kenchington et al. 2006). A less well-known aspect is that trawling disturbance can alter the biogeochemical functioning of the sediments and overlying waters (Riemann & Hoffman, 1991, Duplisea, et al. 2001, Trimmer et al. 2005, Allen & Clark, 2007).

Philippart (1998) compared the composition of specimens, bought from fishermen by Den Helder Zoological Station in the Netherlands, between 1946–1985. This covers the period when fishing effort shifted from otter trawling to beaming. As expected there was a large shift from demersal fish to

benthic species delivered to the Research Station. Of note in relation to otter trawling was the fact that between 1945 and 1960, large numbers of sharks, rays and skates (including smooth hound, thornback ray, common skate and stingray) were caught. Many of these populations are now depleted in the southern North Sea. They concluded that impacts of otter trawling would be more significant for demersal fish and the impacts of beam trawling more significant for the benthos.

The long history of trawling in the North Sea (Philippart 1998, Rijnsdorp et al. 1998, Smit 2001) has undoubtedly led to changes in benthic community structure and functioning (Frid et al. 2000, Jennings et al. 2001, Trimmer et al. 2005). Intensive beam trawling reduces overall benthic production (Jennings et al. 2001, Duplisea et al. 2002) but moderate disturbance may promote production of the smaller invertebrates (Hiddink et al. 2008). Since plaice feed mainly on these smaller organisms, trawling may have had less of a detrimental, or even a slightly positive, impact upon plaice in some areas (Hiddink et al. 2008). Recovery rates of the seabed from trawling are hard to estimate except where fisheries exclusion zones have been activated (Kenchington et al. 2006). A benthic community dominated by long-lived, late maturing epifaunal species, with irregular recruitment and no ability to re-colonise areas rapidly through asexual reproduction may be expected to have low resilience to trawling and dredging disturbance and take a long time to recover (Kenchington et al. 2006). Such communities are more typical of hard-seabeds such as cobble. Recovery of such habitats from intensive trawling probably takes 5-10 years (Collie et al. 1997). In sandy sediments, recovery should be faster since their communities are more adapted to higher levels of natural disturbance (Kaiser et al. 1998). Despite this, particularly long-lived species such as ocean quahog (*Arctica islandica*) are found on sandy and sandy-mud habitats (Witbaard & Bergman 2003; Jak et al. 2009). These populations may take > 10 years to rebuild after suspension of fishing (Witbaard & Bergman, 2003). Using the ERSEM model, Allen and Clark (2007) suggested that sediments in most areas of the North Sea would recover full biogeochemical functioning after 5 yrs following exclusion of trawling but their conclusions were dependent on assumptions about the rates at which in-faunal bioturbating communities would recover.

On the basis of other studies worldwide, the impacts of twin-rigging should be less than for beam trawls since the gear is lighter (Hall 1994, Kaiser et al. 2006); on the other hand the wider spread of the gear means a larger area will be affected. Countering this, twin-rig otter trawls are towed at slower speeds than beam trawls so the affected path lengths will be shorter. As well as by-catch issues, most of the impacts of trawling result from contact between the ground gear and the seabed. The parts of the fishing gear that need to be considered include the doors, sweeps, in case of twin-rigging the clump weight, foot-rope and ticklers if used.

For otter trawling it is generally felt that most impact comes from the passage of the doors (Nilsson & Rosenberg 2003). Door tracks can be imaged by side-scan sonar (Krost et al. 1990) and finer-scale changes measured using high-frequency acoustics (Schwinghamer et al. 1996) or with Sediment Image Profiling (Smith et al. 2003). Trawl door tracks may be up to 30 cm deep in muddy sediments (Krost et al. 1990) and persist for at least 1 year (Tuck et al. 1998, Palanques et al. 2001). The passage of trawl doors can increase water turbidity for up to 5 days (Palanques et al. 2001). However, door tracks in sandy sediments are generally less obvious due to reduced penetration and higher levels of natural disturbance. In an experimental test in sand, a trawl door was set to penetrate 2 cm based on reported field penetrations (Gilkinson et al. 1998). This study showed rather low levels of damage to buried bivalves in this sediment, although they were displaced by the passage of the door.

More generally, the ground gear of the twin-rig trawls should not penetrate the sediment more than 1 or 2 cm and animals buried deeper than this level should not be damaged by this gear. The gear will however damage epi-fauna. Organisms such as sand-mason (*Lanice conchilega* and similar species) are therefore likely to be damaged. Sand-mason has been selected as a characteristic species for habitat subtype H1110\_C (Submerged sandbanks) and so is of interest on the Dogger Bank proposed SAC (Jak et al., 2009). Sand-mason is however widely distributed around the UK ([www.marlin.ac.uk](http://www.marlin.ac.uk)) and is also an ephemeral species adapted to coping with periodic disturbance such as caused by storms. In inter-tidal areas, sand-mason may form dense 'reefs' that may be damaged by fishing gears

(Rabauta et al. 2008) but it is unclear if there are extensive reef structures in the sub-tidal. Other species selected as characteristic of sand-banks include the burrowing bristle star (*Acrocnida brachiata*), Pea urchin (*Echinocyamus pusillis*), Ocean quahog (*Arctica islandica*), Common whelk (*Buccinum undatum*) and rayed trough shell (*Macrura corralina*). The degree to which these species may be damaged by the passage of otter trawls is not known. Sand-banks are prone to periodic disturbance from tidal currents and storms, research on modelling the relative impacts of trawling and natural disturbance is being conducted at Cefas (Dr John Aldridge, email comm.). Initial results suggest that for most of the southern North Sea, natural disturbance is greater than trawling disturbance if considering the top 2 cm of sediment. As one considers deeper disturbance, trawling becomes increasingly important but this deeper disturbance is related to the beam trawl fisheries rather than the twin-rig otter trawl fisheries. These results are preliminary and the publication is currently in review.

The unit of certification fishes on sandy and muddy sands. It is generally thought that sandy habitats should be less vulnerable to damage compared with muddy or hard-substrates (Hall 1994). However, there are some reports of fishing impacts in sand habitats. Prena et al. (1999) reported a reduction in biomass of large epibenthic fauna in Newfoundland associated with trawled areas. Other papers reporting fishery induced changes in sandy habitats include McConnaughey et al. 2000, Brown et al. 2005, McConnaughey et al. 2005 and Stone et al. 2005. Kaiser et al. (2006) included data from 40 otter trawl studies in their global meta-analysis of trawling impacts. When the data were split by habitat, some negative impact on biota was found up to 7 days after trawling in muddy-sand but there was no statistically significant impact on the biota of sand habitat. More data was available from studies on otter trawling in mud habitat and significant impacts were detected for this sediment type.

To conclude, the impacts of otter-trawls on seabed habitats have been studied worldwide but there are surprisingly few studies from the North Sea. In the southern North Sea most impact studies have been conducted since the 1980s when the fisheries were dominated by beam trawls (Kaiser 1998). The general conclusion from available literature is that otter-trawling has less impact compared to beam trawling but negative impacts may still be significant in certain habitats (van Keeken et al. 2004b). Habitats subjected to higher levels of natural disturbance (typically sandy sediments) should be more resilient to fisheries disturbance compared with muddy or hard substrates. Overall it has proven quite difficult to attribute large-scale changes in North Sea benthos to fisheries alone since populations respond to multiple factors. Among the important considerations are that towed gears have been used in the North Sea for at least a century (Kaiser 1998, Philippart 1998) and significant changes in temperature, oceanography and nutrient inputs have also occurred in this period (Callaway et al., 2007, Frid et al. 2001, Kirby et al. 2008). A further example is the decline of the common whelk (*Buccinum undatum*) in the southern North Sea. Although beam trawling may have been partly responsible, the population decline may also have been caused by the use of TBT anti-foulant, TBT is persistent in the marine environment and leads to imposex in molluscs (ten Hallers-Tjabbes et al. 1996, Kaiser 1998, Philippart 1998).

## 8 OTHER FISHERIES AFFECTING TARGET STOCK

Plaice are caught in several directed plaice as well as mixed fisheries in the North Sea. In particular, large amounts of juvenile plaice are discarded in the directed sole fishery. The main method of capture is by beam trawl with lower amounts of plaice being caught by other gears including otter trawls and seine nets. There is a directed brown shrimp (*Crangon* spp) fishery along the coasts of the southern North Sea that has a discard of juvenile plaice.

## 9 STANDARD USED

The MSC Principles and Criteria for Sustainable Fisheries form the standard against which the fishery is assessed and are organised in terms of three principles. Principle 1 addresses the need to maintain the target stock at a sustainable level; Principle 2 addresses the need to maintain the ecosystem in which the target stock exists, and Principle 3 addresses the need for an effective fishery management system to fulfil Principles 1 and 2 and ensure compliance with national and international regulations. The Principles and their supporting Criteria are presented below.

### 9.1 Principle 1

**A fishery must be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery.<sup>2</sup>:**

The intent of this principle is to ensure that the productive capacities of resources are maintained at high levels and are not sacrificed in favour of short term interests. Thus, exploited populations would be maintained at high levels of abundance designed to retain their productivity, provide margins of safety for error and uncertainty, and restore and retain their capacities for yields over the long term.

#### **Criteria:**

1. The fishery shall be conducted at catch levels that continually maintain the high productivity of the target population(s) and associated ecological community relative to its potential productivity.
2. Where the exploited populations are depleted, the fishery will be executed such that recovery and rebuilding is allowed to occur to a specified level consistent with the precautionary approach and the ability of the populations to produce long-term potential yields within a specified time frame.
3. Fishing is conducted in a manner that does not alter the age or genetic structure or sex composition to a degree that impairs reproductive capacity.

### 9.2 Principle 2

**Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends.**

The intent of this principle is to encourage the management of fisheries from an ecosystem perspective under a system designed to assess and restrain the impacts of the fishery on the ecosystem.

#### **Criteria:**

1. The fishery is conducted in a way that maintains natural functional relationships among species and should not lead to trophic cascades or ecosystem state changes.
2. The fishery is conducted in a manner that does not threaten biological diversity at the genetic, species or population levels and avoids or minimises mortality of, or injuries to endangered, threatened or protected species.
3. Where exploited populations are depleted, the fishery will be executed such that recovery and rebuilding is allowed to occur to a specified level within specified time frames, consistent with the precautionary approach and considering the ability of the population to produce long-term potential yields.

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<sup>2</sup> The sequence in which the Principles and Criteria appear does not represent a ranking of their significance, but is rather intended to provide a logical guide to certifiers when assessing a fishery. The criteria by which the MSC Principles will be implemented will be reviewed and revised as appropriate in light of relevant new information, technologies and additional consultations

### 9.3 Principle 3

**The fishery is subject to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable.**

The intent of this principle is to ensure that there is an institutional and operational framework for implementing Principles 1 and 2, appropriate to the size and scale of the fishery.

#### **A. Management System Criteria:**

1. The fishery shall not be conducted under a controversial unilateral exemption to an international agreement.

The management system shall:

2. Demonstrate clear long-term objectives consistent with MSC Principles and Criteria and contain a consultative process that is transparent and involves all interested and affected parties so as to consider all relevant information, including local knowledge. The impact of fishery management decisions on all those who depend on the fishery for their livelihoods, including, but not confined to subsistence, artisanal, and fishing-dependent communities shall be addressed as part of this process.
3. Be appropriate to the cultural context, scale and intensity of the fishery – reflecting specific objectives, incorporating operational criteria, containing procedures for implementation and a process for monitoring and evaluating performance and acting on findings.
4. Observe the legal and customary rights and long term interests of people dependent on fishing for food and livelihood, in a manner consistent with ecological sustainability.
5. Incorporates an appropriate mechanism for the resolution of disputes arising within the system<sup>3</sup>.
6. Provide economic and social incentives that contribute to sustainable fishing and shall not operate with subsidies that contribute to unsustainable fishing.
7. Act in a timely and adaptive fashion on the basis of the best available information using a precautionary approach particularly when dealing with scientific uncertainty.
8. Incorporate a research plan – appropriate to the scale and intensity of the fishery – that addresses the information needs of management and provides for the dissemination of research results to all interested parties in a timely fashion.
9. Require that assessments of the biological status of the resource and impacts of the fishery have been and are periodically conducted.
10. Specify measures and strategies that demonstrably control the degree of exploitation of the resource, including, but not limited to:
  - a) setting catch levels that will maintain the target population and ecological community's high productivity relative to its potential productivity, and account for the non-target species (or

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<sup>3</sup> Outstanding disputes of substantial magnitude involving a significant number of interests will normally disqualify a fishery from certification.

- size, age, sex) captured and landed in association with, or as a consequence of, fishing for target species;
  - b) identifying appropriate fishing methods that minimise adverse impacts on habitat, especially in critical or sensitive zones such as spawning and nursery areas;
  - c) providing for the recovery and rebuilding of depleted fish populations to specified levels within specified time frames;
  - d) mechanisms in place to limit or close fisheries when designated catch limits are reached;
  - e) establishing no-take zones where appropriate.
11. Contains appropriate procedures for effective compliance, monitoring, control, surveillance and enforcement which ensure that established limits to exploitation are not exceeded and specifies corrective actions to be taken in the event that they are.

## **B. Operational Criteria**

Fishing operation shall:

12. Make use of fishing gear and practices designed to avoid the capture of non-target species (and non-target size, age, and/or sex of the target species); minimise mortality of this catch where it cannot be avoided, and reduce discards of what cannot be released alive.
13. Implement appropriate fishing methods designed to minimise adverse impacts on habitat, especially in critical or sensitive zones such as spawning and nursery areas.
14. Not use destructive fishing practices such as fishing with poisons or explosives;
15. Minimise operational waste such as lost fishing gear, oil spills, on-board spoilage of catch etc.
16. Be conducted in compliance with the fishery management system and all legal and administrative requirements.
17. Assist and co-operate with management authorities in the collection of catch, discard, and other information of importance to effective management of the resources and the fishery.

## **10 BACKGROUND TO THE EVALUATION**

### **10.1 Evaluation Team**

**Lead Assessor:** Jason Combes

Dr Combes has a PhD in marine fishery and ecology from the University of London. He has worked for Seafish Industry Authority in the UK. He was project officer for the Clyde Fishery Development Project helping to progress the Nephrops fishery towards MSC assessment. He is a fishery auditor for Moody Marine, within Moody International Certification, and is responsible for the implementation of the MSC Certification programme. Dr. Combes has participated as lead auditor on MSC pre assessments, main assessments, re assessments and surveillance with Moody Marine.

**Project Coordinator:** Rod Cappell

**Richard Millner – P1**

Richard is a fisheries biologist with 34 years experience working for the UK government as an advisor on fish stocks. He has wide experience of flat fish and inshore fisheries around the UK. He has been a member of ICES working groups on flatfish and demersal stocks in the North Sea and was chairman of the ICES Beam Trawl Survey Working Group. He has carried out MSC peer reviews on a number of fisheries assessments including Hastings trammel and trawl fisheries for sole and twin-rig trawling for plaice in the North Sea. He has published on flatfish fisheries and the biology and growth of flatfish.

**Clive Fox – P2**

Clive is based in Scotland and presently employed by the Scottish Association for Marine Science (SAMS) as a lecturer and researcher in fisheries ecology. Clive previously worked for CEFAS from 1992-2007. He has over 20 years experience in fisheries science including extensive field surveys as well as conducting biological research and modelling of commercial species such as cod, plaice and herring. He is member of various national and international scientific committees and was formerly the Chair of ICES Planning Group on North Sea Ichthyoplankton Surveys.

**Rod Cappell – P3**

Rod Cappell is a fisheries management consultant with over 15 years experience in European fisheries. He has a degree in Marine Biology, MSc in Marine Resource Development and a postgraduate certificate in Environmental Economics. Rod is currently working in several areas of European and UK fisheries management including European Commission Regulatory Impact Assessments (Flatfish long term management plan, Shark conservation action plan); Stakeholder consultation on 2012 CFP Reform; Economic approaches to longer term UK fisheries management reforms for Defra; and is currently developing a model management plan and guidance for Scottish Inshore Fisheries Groups. Rod has been involved with a number of MSC assessments including English Channel and North Sea flatfish fisheries, which has involved consultation with key stakeholders in the UK and the Netherlands.

### **10.2 Previous certification evaluations**

The fishery has not been previously assessed against the MSC standard.

### **10.3 Inspections of the Fishery**

Inspection of the fishery focused on the practicalities of fishing operations, the mechanisms and effectiveness of management agencies and the scientific assessment of the fisheries.

Meetings were held with stakeholders as follows. Some of the key issues discussed have been identified for each meeting.



Name	Affiliation	Date	Key Issues
Edwin van Helmond	IMARES	20/01/10	<ul style="list-style-type: none"> <li>• Discards</li> <li>• Observer/sampling programmes</li> </ul>
Paula den Hartog	Productschap Vis	20/01/10	<ul style="list-style-type: none"> <li>• Industry contributions to discard data</li> <li>• Science in stock assessments</li> <li>• Long term management plan</li> </ul>
Henk Heessen	IMARES	21/01/10	<ul style="list-style-type: none"> <li>• North Sea MPAs</li> </ul>
Jan Jaap Poos	IMARES	21/01/10	<ul style="list-style-type: none"> <li>• Developments in science and management of North Sea flatfish fisheries</li> </ul>
Hugh Simms	Lowestoft PO		<ul style="list-style-type: none"> <li>• Fisheries compliance with UK regulations</li> <li>• PO rules, reporting &amp; quota management.</li> </ul>
Christien Absil	Noordzee Foundation	05/03/10	<ul style="list-style-type: none"> <li>• Trawling in protected areas</li> <li>• By-catch</li> <li>• Discarding</li> <li>• Cumulative impacts</li> </ul>
Emilie Hugenholtz	WWF	05/03/10	As above
Henk Offringa	Ministry of Fisheries (LNV)		<ul style="list-style-type: none"> <li>• Fisheries compliance with Dutch regulations</li> </ul>

## 11 STAKEHOLDER CONSULTATION

### 11.1 Stakeholder Consultation

A total of 10 stakeholders were identified and consulted specifically by Moody Marine. Information was also made publicly available at the following stages of the assessment:

Date	Purpose	Media
21/10/09	Announcement of assessment	Direct E-mail/letter Notification on MSC website Advertisement in press
27/11/09	Notification of Assessment Team nominees	Direct E-mail Notification on MSC website
8/12/09	Notification of intent to use MSC FAM V2 Standard Assessment Tree	Direct E-mail Notification on MSC website
15/12/09	Notification of assessment visit and call for meeting requests	Direct E-mail Notification on MSC website
19/01/10 -22/01/10	Assessment visit	Meetings
12/03/10	Notification of Proposed Peer Reviewers	Direct E-mail Notification on MSC website
02/06/10	Notification of Public Draft Report	Direct E-mail Notification on MSC website
	Notification of Final Report	Direct E-mail Notification on MSC website

### 11.2 Stakeholder Issues

Science and management stakeholders provided information for inclusion in this assessment. Environmental NGO stakeholders (WWF and Noordzee Foundation) provided background information for inclusion in the assessment and subsequently made a written submission detailing their areas of concern (submitted by C. Absil, 05/03/10). These are summarised verbatim below:

- **Trawling in protected areas**

Or areas of high ecological value (Doggerbank, Cleaver or Clover bank, Central Oyster grounds and potentially other areas) with heavy gear and gear that covers a large surface including the use of chains. We propose a Spatial Management Plan is presented by Moody and the client, which includes fully protected or closed areas (in addition to seasonal closures).

**Assessment team comment:**

As assessors of this fishery it is not within the remit of the Assessment Team to develop or present a Spatial Management Plan. We do however note that the client has developed spatial management proposals in association with this stakeholder.

- **By-catch**

Data were shared but there is insufficient data on cod by-catch, sharks, skates and rays and potentially other (ETP) species. We request that this type of data is gathered and analysed to assess risk for these species.

**Assessment team comment:**

The Assessment Team recognises some information was provided, but shares these concerns and has scored the fishery accordingly, requiring a condition to be met.

- **Discards**

Data with 115mm mesh. It may be expected in the fished area presented by Osprey Trawler group,

by-catch and discard of cod and potentially other species outside safe biological limits, or non-quota species may be high.

**Assessment team comment:**

Some evidence was provided to the Assessment Team on the discarding of cod and other by-catch species, indicating by-catch and discarding of these species by UoC vessels would be comparatively lower than other vessels operating in the fishery. However more substantial information specific to the UoC is required. It has scored the fishery accordingly, requiring a condition to be met.

- **Cumulative impacts**

Since the Dutch and the Danish fleet have committed to the MSC process, we expect various MSC assessment processes in the coming year. However, many of these consist of small UoCs. This poses a problem in assessing the overall or so-called cumulative impacts. We therefore ask you to not downplay any effects, due to the fact that this certification concerns only a limited number of vessels. Rather we ask you to look into the consequences of an increase in the number of vessels.

**Assessment team comment:**

The assessment process takes into account both the specific UoC and the wider fishery and therefore does make some consideration of cumulative impacts. Also any increase in the number of vessels within a UoC would require the Certification Body to revise its assessment prior to making any recommendation to the MSC that the UoC be altered. The MSC would then make the final determination on whether such a change would be permissible.

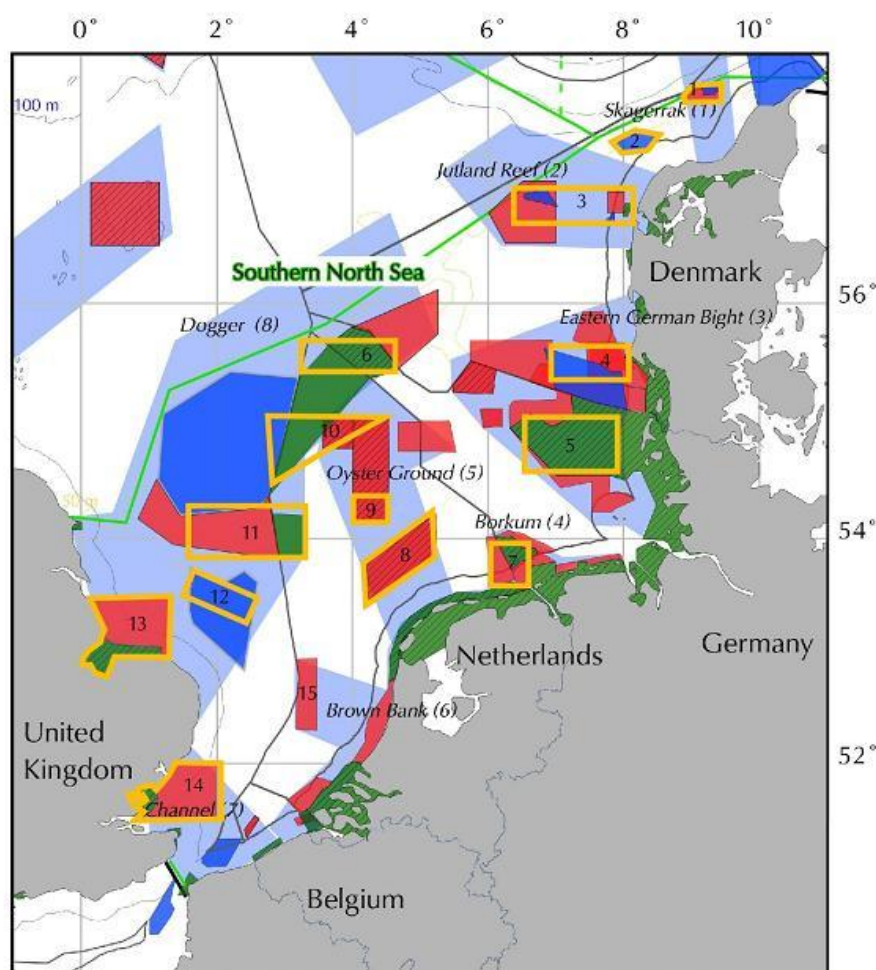
**WWF Nederland and NSF**

WWF and NSF submitted a chart on 12<sup>th</sup> May 2010 with the following statement:

“This map is prepared for the purpose of the Osprey MSC certification. WWF has conducted a study identifying areas beyond the Dutch EEZ, relevant for restoration and conservation and based on latest available knowledge. Where management plans for marine protected areas (e.g. N2000 and OSPAR) are absent, or yet to be determined, this map provides a minimum set of priority areas for closures to trawling. These proposed closures will help start the regeneration and restoration of the North Sea ecosystems towards a more natural species community composition and to work towards achieving GES. This map may be subject to change, e.g. when more scientific data becomes available. For questions, please contact Emilie Hugenholtz at WWF Netherlands.”

At the same time WWF and NSF presented the same proposed additional closed areas to the Ekofish group, which attained MSC certification in 2009.

Priorities for trawl-free areas (yellow boundaries) in representative core zones of the southern North Sea (modified from Christiansen 2009).



Christiansen, S., 2009. Towards Good Environmental Status - A Network of Marine Protected Areas for the North Sea. WWF Germany, Hamburg, pp. 1-104.

### Map Legend

Green - N2000 (Habitats Directive) areas, in various states of implementation

Red - Additional MPA proposals made by NGO coalition (see Christiansen 2009)

Dark Blue - Possible N2000 sites in various states of preparation by national conservation agencies

Light Blue Belts - specially managed areas, proposed by NGO Coalition (see Christiansen, 2009).

Criteria for Blue Belts:

- Representation and connectivity - by ranging from the coasts to offshore, shallow to deep-water, they include as much habitat heterogeneity as possible and provide an ecological link between the habitats represented in individual MPAs;
- Importance for (OSPAR-listed) species and habitats. Blue Belts form priority areas for the restoration, conservation of species and habitats towards achieving a Good Environmental Status (GES) of the North Sea and they include:
  - Priority areas for delivering transboundary spatial planning and MPA management;
  - Priority areas for delivery of GES
  - Buffer zones around the designated MPAs;
  - Best environmental practice zones

Yellow border: Name and number of core area for establishing bottom trawl-free zones. This set of areas is based on current knowledge and considered to be the minimum, and subject to further additions, in order to start regeneration and restoration of the North Sea ecosystems towards a more natural species community composition. More information on areas can be found on next page. The report by Christiansen, S., 2009. contains the relevant references.

Light green line- Limitation of study area and ecological subregion Southern North Sea to the north (see Christiansen 2009): Study area further limited to area outside of 12 nm.

### **Names and criteria for core areas proposed to be closed to all kind of bottom trawling (May 2010):**

Numbers as in map:

1. „Store Rev“, SCI Danmark, (see Christiansen 2009, p. 35-36), reef
2. „Gul Rev“, SCI Danmark, (see Christiansen 2009, p. 35-36), reef
3. „Jyske Rev“ and „Thyborøn Stenvolde“, SCIs Danmark, (see Christiansen 2009, p. 35-36), reef
4. „Horns Rev“, NGO proposal (Christiansen 2009, p. 35-36), reef
5. „Sylter Außenriff“, SCI Germany, (see Christiansen 2009, p. 38-39), reef
6. „Dogger Bank“, SCI Germany, and northern part of SCI Netherlands, (see Christiansen 2009, p. 39, 42, 44), sandbank
7. „Borkum Riffgrund“, SCI Germany, NGO proposal on Dutch side (see Christiansen 2009, p. 39, 42), reef
8. „Friese Front“, NGO proposal (Christiansen 2009, p. 44), OSPAR criteria - protection of vulnerable (OSPAR listed) species: *Arctica islandica*, high biomass and diversity
9. „Centrale Oestergronden“, NGO proposal (Christiansen 2009, p. 43), OSPAR criteria - protection of vulnerable (OSPAR listed) species and habitats: *Arctica islandica*, seapens and burrowing megafauna, high diversity and biomass
10. „Arctica islandica Ground and Dogger Bank SCI Netherlands, Arctica ground NGO proposal (Christiansen 2009, p. 42), OSPAR criteria - protection of vulnerable (OSPAR listed) species: *Arctica islandica*
11. „Skate Hole and Outer Silver Pit in prolongation of Botney Gut and Klaver Bank SCI, Netherlands“, NGO proposal (Christiansen 2009, p. 43, 48), OSPAR criteria - protection of vulnerable (OSPAR listed) species: demersal elasmobranchs, seapens and burrowing megafauna, *Arctica islandica*
12. „North Norfolk Banks“, possible SAC, in consultation in UK (see <http://www.jncc.gov.uk/page-4535>), sandbank
13. „The Greater Wash and Norfolk sandy mounds“ - existing N2000 area inshore, (see NGO proposal (Christiansen 2009, p. 47), includes new potential SCIs „Inner Dowsing, Race Bank and North Ridge“, Haisborough, Hammond and Winterton“ (possible SAC, see <http://www.jncc.gov.uk/page-4535>), sandbanks, and OSPAR criteria - protection of vulnerable (OSPAR listed) species: demersal elasmobranchs
14. „Greater Thames estuary and banks“ - NGO proposal (Christiansen 2009, p. 47), OSPAR criteria - protection of vulnerable (OSPAR listed) species: demersal elasmobranchs
15. „Bruine Bank corridor to Kustzee“, NGO proposal (Christiansen 2009, p. 42 and ), OSPAR criteria - protection of vulnerable (OSPAR listed) species

Reference:

Christiansen, S., 2009. Towards Good Environmental Status - A Network of Marine Protected Areas for the North Sea. WWF Germany, Hamburg, pp. 1-104.

### **Assessment Team comment:**

The assessment team acknowledge that there is an ongoing process of designating areas within the North Sea and developing related management plans. The assessment team note that the map shows areas where WWF, NSF and the NGO coalition are seeking further designation. The assessment team also notes that the Client Action Plan includes a map nominating areas to be considered by Osprey

Trawler vessels as no trawl zones, which are consistent with the current Ekofish no trawl zones. These voluntary no trawl zones are not the result of a condition set as part of the MSC process, but based on agreements between the concerned parties.

As the WWF/NSF map does not contain new scientific evidence the assessment team, through the MSC process, can only acknowledge receipt of the map. The assessment team will continue to review the impacts that the designation process, and resultant management plans, have upon this fishery during subsequent surveillance audits.

## **12 OBSERVATIONS AND SCORING**

### **12.1 Introduction to scoring methodology**

The MSC Principles and Criteria set out the requirements of certified fishery. These Principles and Criteria have been developed into a standard (Fishery Assessment Methodology) assessment tree - Performance Indicators and Scoring Guideposts - by the MSC, which is used in this assessment.

The Performance Indicators (PIs) have been released on the MSC website. In order to make the assessment process as clear and transparent as possible, each PI has three associated Scoring Guideposts (SGs) which identify the level of performance necessary to achieve 100, 80 (a pass score), and 60 scores for each Performance Indicator; 100 represents a theoretically ideal level of performance and 60 a measurable shortfall.

For each Performance Indicators, the performance of the fishery is assessed as a 'score'. In order for the fishery to achieve certification, an overall weighted average score of 80 is necessary for each of the three Principles and no Indicator should score less than 60. As it is not considered possible to allocate precise scores, a scoring interval of five is used in evaluations. As this represents a relatively crude level of scoring, average scores for each Principle are rounded to the nearest whole number.

Weights and scores for the Fishery are presented in the scoring table (Appendix A).

## **13 LIMIT OF IDENTIFICATION OF LANDINGS FROM THE FISHERY**

Traceability of product from the sea to the consumer is vital to ensure that the MSC standard is maintained. There are several aspects to traceability that the MSC require to be evaluated: Traceability within the fishery; at-sea processing; at the point of landing; and subsequently the eligibility of product to enter the chain of custody. These requirements are assessed here.

### **13.1 Traceability within the fishery**

Osprey Trawlers Services Ltd are the certificate holders; only vessels recognised within the group, and abiding by any controls applied to this Unit of Certification, are eligible to land MSC certified fish under this certificate. During the fishery assessment the Osprey Trawlers Services Ltd group was:

1. E104 Ansgar 36.6m Flag vessel from England
2. H357 Good Hope 32.9m Flag vessel from England
3. PW447 Louwe Senior 36.6m Flag vessel from England
4. H426 Neeltje 28.8m Flag vessel from England

The skippers of these vessels are responsible for ensuring the provenance of the certified plaice. Any changes in the size of the group will be evaluated during ongoing surveillance audits.

As with all EU vessels over 12m in length, the vessels within the UoC must complete logbooks detailing the date, gear, volume and location (by ICES rectangle) of all catch retained onboard. This information on fishing activity is cross-checked with satellite tracking using a vessel monitoring system (VMS). All catch must be retained onboard prior to landing to a designated port.

Dutch fishery officials (LNV), the UK control agency (MMO) and the Lowestoft PO report no compliance issues specific to these vessels and a high level of compliance in this fleet overall. Therefore the risk that catch is misreported is deemed to be low.

The UoC vessels only fish within the area identified in the UoC (ICES sub-area IVb) during the proposed fishing season (01 April to 15 November) and therefore all plaice caught within these spatial and temporal limits would be part of the UoC.

### **13.2 At-sea processing**

Processing at sea does not occur beyond the removal of the guts from the fish, placing in a fish box and icing.

As the level of at sea processing is minimal and boxes are open and available for inspection at sea and on land, the potential for additional non-UoC fish entering the system is deemed to be low.

### **13.3 Points of landing**

Landings will be made primarily at Harlingen and on occasion to other Dutch and Danish designated ports, namely Urk, Cuxhaven and Bremerhaven). At all of these ports regular inspection of landings are made by fishery officials to ensure landed quantities match log book submissions.

Ultimately all certified fish will pass through the sales system at Urk fish market. The certified fish remain the property of the individual vessels fishing under Osprey Trawler Services until sold on the Urk fish auction.

Dutch fishery officials (LNV) report no compliance issues specific to these vessels and a high level of



compliance in this fleet overall. As the fish passes through two auction markets where it is subject to checks by third parties, the risk of unreported fish entering consignments is considered low.

#### **13.4 Eligibility to enter chains of custody**

The scope of this certification ends at Urk market when the fish is sold at auction. Downstream certification of the product would require appropriate certification of storage and handling facilities at this location.

#### **13.5 Target Eligibility date**

As per TAB 21 the date from which product from a certified fishery is eligible to bear the label (the eligibility date) is any date prior to the certification of the fishery back to a maximum of six months prior to the publication of the most recent Public Comment Draft Report. In this case the date therefore relates to the start of the fishing season in which the Public Comment Draft Report is published - target eligibility date is 01 April 2010. Fish caught since that date must have been stored in a facility with a valid MSC chain of custody (CoC) certificate.

## 14 ASSESSMENT RESULTS

The Performance of the Fishery in relation to MSC Principles 1, 2 and 3 is summarised below:

MSC Principle	Fishery Performance
<b>Principle 1:</b> Sustainability of Exploited Stock	Overall : 81.0
<b>Principle 2:</b> Maintenance of Ecosystem	Overall : 80.0
<b>Principle 3:</b> Effective Management System	Overall : 85.5

**The fishery attained a score of 80 or more against each of the MSC Principles and did not score less than 60 against any Indicators. It is therefore determined that the Osprey Trawler Services Ltd. North Sea ICES IVb twin rigged plaice fishery be certified according to the Marine Stewardship Council Principles and Criteria for Sustainable Fisheries.**

### 14.1 Conditions

As a standard requirement of the MSC certification methodology, the fishery shall be subject to (as a minimum) annual surveillance audits. These audits shall be publicised and reports made publicly available.

The fishery attained a score of below 80 against seven Performance Indicators. The assessment team has therefore set conditions for continuing certification that the client for certification is required to address. The conditions are applied to improve performance to at least the 80 level within a period set by the certification body but no longer than the term of the certification.

As a standard condition of certification, the client shall develop an 'Action Plan' for Meeting the Conditions for Continued Certification', to be approved by Moody Marine. As per MSC Policy Advisory 17, this is presented below the relevant condition.

The four conditions set are associated with the six key areas of performance of the fishery. The Conditions, associated timescales and relevant Scoring Indicator are set out below.

#### Condition 1

Harvest Strategy	1.2.3 (information & monitoring)
<b>PI</b>	Relevant information is collected to support the harvest strategy
<b>SG 60</b>	<u>Some</u> relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy. Stock abundance and fishery removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.
<b>SG 80</b>	<u>Sufficient</u> relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy. Stock abundance and fishery removals are <u>regularly monitored at a level of accuracy and coverage consistent with the harvest control rule</u> , and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule. There is good information on all other fishery removals from the stock.
<b>SG 100</b>	A <u>comprehensive range</u> of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly relevant

	<p>to the current harvest strategy, is available.</p> <p><u>All information</u> required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of the inherent <u>uncertainties</u> in the information [data] and the robustness of assessment and management to this uncertainty.</p>
<b>Scoring</b>	<b>70</b>
<b>Rationale</b>	<p>Data on plaice discards are derived from a limited programme of observer trips on Dutch, Danish, German and UK vessels for 2000-2008. The previous discard monitoring programmes have not included the vessels of the fishery under assessment.</p> <p>Anecdotal evidence was presented on main by-catch species and the amount of by-catch by the UoC, but limited quantitative data on discards is available. Therefore at present the requirements for “good information on all other fishery removals from the stock” (1.2.3) and “adequate information to support a <u>partial strategy</u> to manage main by-catch species” (2.2.3) are not met.</p>
<b>Condition</b>	<p>Produce a comprehensive catch profile for the UoC detailing quantities of all retained and discarded species.</p> <p>We appreciate that there is limited capacity in terms of the number of vessels that can be included in the official discard programme. We therefore suggest that either:</p> <ul style="list-style-type: none"> <li>a. One or more Osprey Trawler Services vessels take part in the IMARES discard sampling and/or observer programmes; or</li> <li>b. Undertake self sampling using a protocol consistent with the IMARES discard sampling programme. The species, number and weight of all discards should be recorded in a similar format to the IMARES programme.</li> </ul> <p>Note: A full species list is required – not only retained plaice and cod.</p> <p>The data set of all discards derived from the above should be compiled with records of all retained species to create a comprehensive data set on total catch for presentation to the audit team. This data set should be analysed, including modelling the impact of cod catches on cod recovery.</p> <p><b>Timescale:</b> A comprehensive tabulated and analysed data set detailing the species, number and weight of all species caught by the vessels under each UoC (and whether retained or not) must be available at the first surveillance audit. Analysis should include a simple model showing the impact of UoC total cod catches (retained and discarded) on cod recovery. Provision of this information is an ongoing requirement and, following review at first audit, will be sought for subsequent audits.</p>
<b>Client Action Plan</b>	<p>1.1. In 2010 the vessels of Osprey Group cannot be included in the IMARES discard monitoring programme. Osprey Group therefore will undertake its own discard sampling consistent with the IMARES programme. IMARES has sent the protocols and sample list consistent with the IMARES discard programme to Osprey Group on 25 March 2010.</p> <p>1.2. The current IMARES protocol only includes plaice, dab and cod discard monitoring. Therefore Osprey Group will additionally undertake a self sampling programme for all species caught.</p> <p>1.3. Osprey Group Skippers will be instructed to sample two fishing hauls (at 4pm each Tuesday and Thursday) during each fishing trip following the IMARES protocol. The number and weight of all discards (in the sample taken) will be recorded on an amended IMARES sample list.</p> <p>1.4. The skippers and crew of the Osprey Group vessels will be instructed and trained in the use of the amended IMARES sample list. At least one crew member on board of each of the Osprey Group vessels will be trained to identify all species caught to species level. To help with identification each vessel will be provided with species guides on both fish species and bottom fauna. Of each</p>

	<p>specimen in the catch that cannot be identified to species level a digital photograph will be taken to allow identification by a specialist.</p> <p>1.5. The skippers and crew of the Osprey Group vessels will be instructed and trained in the identification of Endangered, Threatened and Protected (ETP) species. All interactions with ETP species will be recorded on a special ETP interactions recording sheet.</p> <p>1.6. The collected data will be sent to IMARES on a monthly basis for analysis. The analysis will include a regular comparison of the data from Osprey vessel with vessels in the IMARES discard sampling programme.</p> <p>1.7. Osprey Group will contract IMARES (or another recognized scientific institution like ILVO) to conduct two observer trips on board of Osprey Group vessels. During these trips discards of all species (including plaice) will be recorded.</p> <p>1.8. The scientific institution contracted by Osprey Group will analyze all data collected and present the results annually in a report.</p> <p>1.9. The analysis by the scientific institution will include a simple model that shows the impact of the UoC total cod catches (retained and discarded) on cod recovery.</p> <p>1.10. At the first surveillance audit the data and analysis of the first year of recording of discard data will be presented to the assessment team. Following review of this information at the first surveillance audit, the discard recording will be continued and the results will be presented to the assessment team at the subsequent audits.</p>
<b>Consultation on condition</b>	Consultation with IMARES re. involvement with discard sampling programme and ongoing collaboration

<b>Retained non-target species</b>	<b>2.1.1</b>
<b>PI</b>	The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species.
<b>SG 60</b>	<p>Main retained species are <u>likely</u> to be within biologically based limits or if outside the limits there are <u>measures</u> in place that are <u>expected</u> to ensure that the fishery does not hinder recovery and rebuilding of the depleted species.</p> <p>If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the retained species to be outside biologically based limits or hindering recovery.</p>
<b>SG 80</b>	Main retained species are <u>highly likely</u> to be within biologically based limits, or if outside the limits there is a <u>partial strategy</u> of <u>demonstrably effective</u> management measures in place such that the fishery does not hinder recovery and rebuilding.
<b>SG 100</b>	<p>There is a <u>high degree of certainty</u> that retained species are within biologically based limits.</p> <p>Target reference points are defined and retained species are at or fluctuating around their target reference points</p>
<b>Scoring</b>	75
<b>Rationale</b>	<p>Although by the MSC definition, cod is not a main retained species by the UoC, the status of the cod stock in the North Sea is of particular concern and it is listed under OSPAR (see separate comments under the ETP sections of this report). For this reason the catches of cod by the UoC, even though small, need to receive some attention. Currently the scientific advice is that although SSB has increased from the low of 2006, it is still below <math>B_{lim}</math> (ICES WG, 2009). Cod re-building is currently managed under the European Council cod management plan. This plan includes a target fishing mortality of 0.4 (EC 1342/2008) and the 2009 cod quota was set at 28,798 tonnes by the EU Commission. In 2009 the UoC landings data provided to the assessment team indicate landings of around 9 tonnes of cod per vessel against this quota. The UoC voluntarily take measures such as use of lowered headline to reduce the amount of cod caught and fish in an area where cod are currently not common. Data from comparable fisheries suggest cod discard rates in twin-rig trawl fisheries are low although this may vary with the</p>

	area fished. On this basis it is unlikely that the levels of cod landed by the UoC will have a significantly negative impact on cod rebuilding and the UoC is taking measures that are expected to ensure that the fishery does not hinder recovery and rebuilding of this depleted species. Condition 2 will also address this issue.
<b>Condition</b>	See condition 1 above
<b>Client Action Plan</b>	See condition 1 above
<b>Consultation on condition</b>	See condition 1 above

<b>Discarded species</b>	<b>2.2.3 Information/monitoring</b>
<b>PI</b>	Information on the nature and amount of by-catch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage by-catch.
<b>SG 60</b>	<u>Qualitative information</u> is available on the amount of main by-catch species affected by the fishery. Information is <u>adequate</u> to <u>broadly understand</u> outcome status with respect to biologically based limits. Information is adequate to support <u>measures</u> to manage by-catch.
<b>SG 80</b>	<u>Qualitative information and some quantitative information</u> are available on the amount of main by-catch species affected by the fishery. Information is sufficient to estimate outcome status with respect to biologically based limits. Information is adequate to support a <u>partial strategy</u> to manage main by-catch species. Sufficient data continue to be collected to detect any increase in risk to main by-catch species (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy).
<b>SG 100</b>	<u>Accurate and verifiable information</u> is available on the amount of all by-catch and the consequences for the status of affected populations. Information is <u>sufficient</u> to quantitatively estimate outcome status with respect to biologically based limits with a <u>high degree of certainty</u> . Information is adequate to support a <u>comprehensive strategy</u> to manage by-catch, and evaluate with a high degree of certainty whether a strategy is achieving its objective. Monitoring of by-catch data is conducted in sufficient detail to assess ongoing mortalities to all by-catch species.
<b>Scoring</b>	<b>70</b>
<b>Rationale</b>	Anecdotal evidence was presented on main by-catch species and the amount of by-catch by the UoC to the audit team. Some literature data exist to support this. The IMARES discard sampling program is in place and vessels from the UoC have taken part in it. <u>Qualitative information and some quantitative information</u> are available on the amount of main by-catch species affected by the fishery...Information is adequate to broadly understand outcome status with respect to biologically based limits and the information is adequate to support measures to manage by-catch but the amount and coverage of the data need to be improved. Because the IMARES discard program is on-going this goes some way towards the 80 score criteria – ‘Sufficient data continue to be collected to detect any increase in risk to main by-catch species (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy)’.
<b>Condition</b>	See condition 1 above
<b>Client Action Plan</b>	See condition 1 above
<b>Consultation on condition</b>	See condition 1 above

## Condition 2

<b>ETP species</b>	<b>2.3.3 (information / monitoring)</b>
<b>PI</b>	<p>Relevant information is collected to support the management of fishery impacts on ETP species, including:</p> <ul style="list-style-type: none"> <li>- information for the development of the management strategy;</li> <li>- information to assess the effectiveness of the management strategy; and</li> <li>- information to determine the outcome status of ETP species</li> </ul>
<b>SG 60</b>	<p>Information is <u>adequate</u> to <u>broadly understand</u> the impact of the fishery on ETP species.</p> <p>Information is adequate to support <u>measures</u> to manage the impacts on ETP species</p> <p><u>Information</u> is sufficient to <u>qualitatively</u> estimate the fishery related mortality of ETP species.</p>
<b>SG 80</b>	<p>Information is <u>sufficient</u> to determine whether the fishery may be a threat to protection and recovery of the ETP species, and if so, to measure trends and support a <u>full strategy</u> to manage impacts.</p> <p><u>Sufficient data</u> are available to allow fishery related mortality and the impact of fishing to be <u>quantitatively</u> estimated for ETP species.</p>
<b>SG 100</b>	<p>Information is <u>sufficient</u> to <u>quantitatively</u> estimate outcome status with a high degree of certainty.</p> <p>Information is adequate to support a <u>comprehensive strategy</u> to manage impacts, minimize mortality and injury of ETP species, and evaluate with a high degree of certainty whether a strategy is achieving its objectives.</p> <p><u>Accurate and verifiable information</u> is available on the magnitude of all impacts, mortalities and injuries and the consequences for the status of ETP species</p>
<b>Scoring</b>	<b>65</b>
<b>Rationale</b>	<p>Information is adequate to broadly understand the impact of the fishery on ETP species – possible interactions have been identified.</p> <p>Information is adequate to support measures to manage the impacts on ETP species – information is adequate but could be improved.</p> <p>Data on catches of rays by species needs to be collected.</p>
<b>Condition</b>	<p>Review discards &amp; catch records (produced under condition 1) against list of possible ETP species to enable a sufficiently high degree of confidence in the lack of ETP/fishery interactions.</p> <p>If any interactions are identified, the effects of these interactions on the population of the ETP species should be evaluated against available population estimates. If significant impacts are identified, then a management plan should be drawn up to reduce the impact of the fishery on the ETP species of concern and continued monitoring put in place to ensure that the approach is working. Evidence of effective remedial action must be presented to the audit teams.</p> <p>Evidence must be provided that vessels are complying with all EU or national strategies in relation to ETP species, including logbook submissions showing appropriate recording of sharks and ray catches and plots to show compliance with spatial management.</p> <p><b>Timescale:</b> Provision of information by first surveillance audit and ongoing thereafter.</p>
<b>Client Action Plan</b>	<p>2.1. The skippers and crew of the Osprey Group vessels will be trained in the identification and handling of Endangered, Threatened and Protected (ETP) species.</p> <p>2.2. A protocol for the handling of ETP species will be developed and included in the Code of Conduct.</p> <p>2.3. A manual (list of species and identification tools) will be developed and kept on board of each Osprey Group vessel.</p> <p>2.4. All interactions with ETP species will be recorded on a special ETP interactions recording sheet.</p>

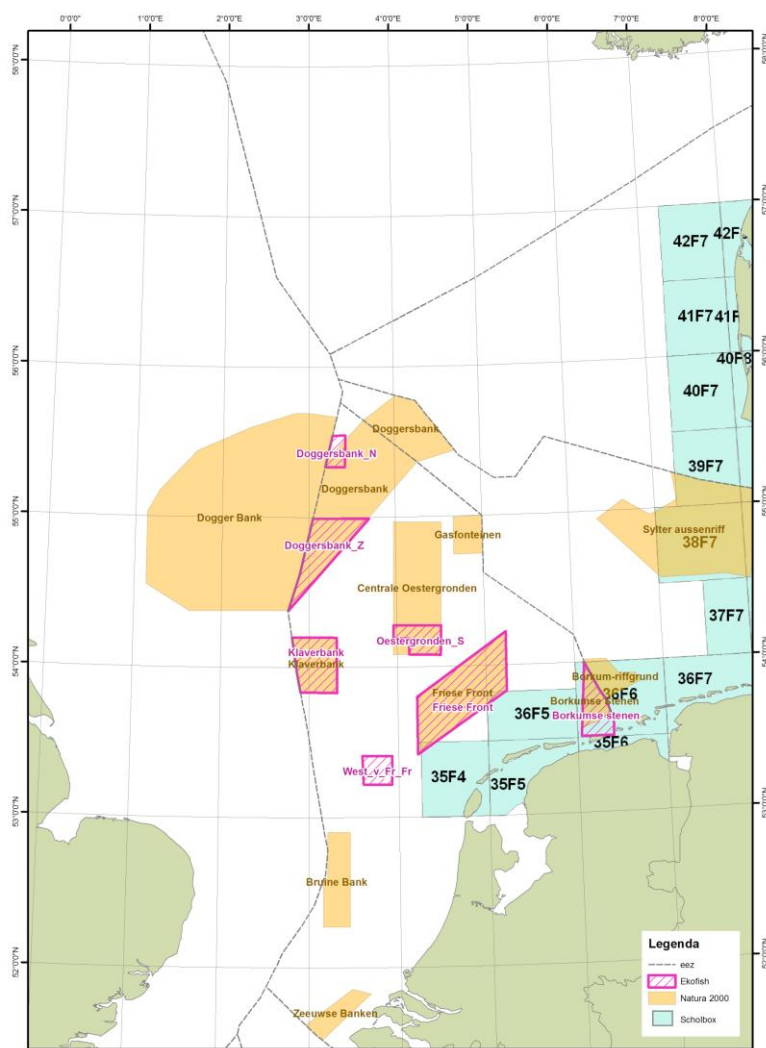
	<p>2.5. Where significant interactions with an ETP species are identified the management of the Osprey Group will take appropriate actions to reduce or avoid these interactions. Measures will be implemented through the Code of Conduct.</p> <p>2.6. A digital photograph of each unidentified ETP species caught will be taken and stored in a computer file.</p> <p>2.7. At the yearly surveillance audits the records of interactions with ETP species and the management responses will be presented to the assessment team.</p>
<b>Consultation condition</b>	All actions to be undertaken by client therefore no further consultation required.

### Condition 3

<b>ETP species</b>	<b>2.3.3 (information / monitoring)</b>
<b>PI</b>	<p>Relevant information is collected to support the management of fishery impacts on ETP species, including:</p> <ul style="list-style-type: none"> <li>- information for the development of the management strategy;</li> <li>- information to assess the effectiveness of the management strategy; and</li> <li>- information to determine the outcome status of ETP species</li> </ul>
<b>SG 60</b>	<p>Information is <u>adequate</u> to <u>broadly understand</u> the impact of the fishery on ETP species.</p> <p>Information is adequate to support <u>measures</u> to manage the impacts on ETP species</p> <p><u>Information</u> is sufficient to <u>qualitatively</u> estimate the fishery related mortality of ETP species.</p>
<b>SG 80</b>	<p>Information is <u>sufficient</u> to determine whether the fishery may be a threat to protection and recovery of the ETP species, and if so, to measure trends and support a <u>full strategy</u> to manage impacts.</p> <p><u>Sufficient data</u> are available to allow fishery related mortality and the impact of fishing to be <u>quantitatively</u> estimated for ETP species.</p>
<b>SG 100</b>	<p>Information is <u>sufficient</u> to <u>quantitatively</u> estimate outcome status with a high degree of certainty.</p> <p>Information is adequate to support a <u>comprehensive strategy</u> to manage impacts, minimize mortality and injury of ETP species, and evaluate with a high degree of certainty whether a strategy is achieving its objectives.</p> <p><u>Accurate and verifiable information</u> is available on the magnitude of all impacts, mortalities and injuries and the consequences for the status of ETP species</p>
<b>Scoring</b>	<b>65</b>
<b>Rationale</b>	<p>It is likely that impacts of twin-rig otter trawls used by the UoC on <i>Arctica islandica</i> will be less than for heavier beam trawls but these data do need to be improved.</p> <p>The fished areas do overlap with proposed marine SAC areas, including Dogger Bank. This activity should be taken into account as the Dutch government develops the Natura2000 management plan for this area. The UoC code of conduct states that it will abide by any spatial restrictions emerging from this management.</p>
<b>Condition</b>	<p>If the vessels participating in this fishery continue to fish in the proposed marine SAC areas they should contribute to the formation of an appropriate management plan by providing detailed information on the spatial and temporal extent of gear interactions in these areas.</p> <p>To identify any interactions with especially sensitive habitats an overlay map should be produced showing fishing tracks of all vessels in the UoC <u>and</u> the seabed habitat as well as the extent of proposed SACs.</p> <p>If significant interactions are identified, then a management plan should be drawn</p>

	<p>up to reduce the impact of the fishery on the sensitive habitats and continued monitoring put in place to ensure that the approach is working. Evidence of effective remedial action must be presented to the audit teams.</p> <p>The fishery should co-operate with the development of habitat management plans by relevant statutory agencies through the provision of VMS, catch data along with any relevant anecdotal evidence.</p> <p><b>Timescale:</b> By first surveillance audit and ongoing thereafter.</p>
<b>Client Action Plan</b>	<p>3.1. Osprey Group will contract a scientific institution or specialist to produce an overlay map with lesser and more sensitive habitats (sediment types), the spatial distribution of the UoC fishing activities (Fishing tracks, GPS and VMS data) and the extend of proposed Natura 2000 SACs, After review during the first surveillance visit an updated overlay map will be presented to the audit team at subsequent surveillance visits,.</p> <p>3.2. Until the moment that management plans for the proposed Natura 2000 SACs are implemented Osprey Group will avoid fishing in the areas that are marked on the attached map. (These are the same areas that are currently avoided by of the Ekofish North Sea (ICES IVb) twin rigged otter trawl plaice fishery.)</p> <p>3.3. The overlay map will be updated at a regular basis, When evaluation of the data that are integrated in the overlay map show significant interactions of the UoC fishery with especially sensitive habitats the management of the Osprey Group will take appropriate management action in order to avoid fishing in areas with these habitats. Measures will be implemented through the Code of Conduct and communicated to the audit team at each surveillance visit.</p> <p>3.4. Osprey Group will liaise with their fishing industry representatives and government agencies to cooperate with the development of management plans for fishery in Natura 2000 SACs. Osprey Group will provide these fishing industry representatives and other relevant statutory agencies with detailed (VMS/GPS) information of on the spatial and temporal extent of their fishing activities (in proposed Natura 2000 SAC areas).</p>





<b>Scoring</b>	<b>75</b>
<b>Rationale</b>	<p>A ‘perverse incentive’ has arisen in overlapping effort management measures under the cod recovery plan and the North Sea flatfish LTMP. As days at sea are allocated to particular gear sizes, vessels in the UoC are encouraged to fish with a smaller mesh than they would choose to fish with. The result is a greater proportion of discards of target and non-target species than would otherwise be the case.</p> <p>It is recognised that this situation is the result of an EU-level management regime, which the UoC must abide by. Effort management measures are revised on an annual basis. The fishery should, however, provide information to the relevant management authorities (including the catch profiling data proposed under conditions 2 and 3) to inform appropriate regulatory revision that removes the negative incentive.</p> <p>If the negative incentive is not removed by the proposed timescale, an alternative approach is required to deliver the same effect, namely a reduction in discards. This may be through alternative fishing practices such as changes to gear set up, location or timing, if those changes are permitted within the relevant regulations, the UoC and the Code of Conduct.</p>
<b>Condition</b>	<p>Provide evidence that data and information to encourage management revisions were provided to the relevant authorities.</p> <p>Provide evidence of reduced levels of discarding through either removal of the negative incentive (enabling larger mesh sizes to be operated full time) or through alternative actions.</p> <p><b>Timescale:</b> By first surveillance audit: provision of data and information encouraging appropriate management revisions. By third surveillance audit: evidence of reduced discarding levels across the fishery to levels equivalent to 110mm+ mesh sizes.</p>
<b>Client Action Plan</b>	<p>4.1. Osprey Group will undertake its own discard sampling monitoring as described in 1.1 – 1.9.</p> <p>4.2. Osprey Group will have the discard data analyzed by a qualified scientist (see 1.8.).</p> <p>4.3. The analysis will include an analysis (comparison) of the levels of discarding with 95-110 mm cod end and 110-130mm cod end.</p> <p>4.4. The Osprey group will provide the relevant authorities with data and information in order to encourage management revisions) to remove the negative incentive (smaller mesh sizes resulting in more days at sea).</p> <p>4.5. Osprey Group will provide the audit team with evidence of the actions taken to encourage the relevant authorities to remove the negative incentive at the first surveillance visit.</p> <p>4.6. In case the negative incentive to use 95-110mm mesh size is not removed before the first surveillance audit the management of Osprey Group will implement alternative measures to reduce discard levels to 110+mm mesh size or better. These measures can include the avoidance of areas with higher discard percentages and alternative gear set up.</p> <p>4.7. The Osprey Group will provide the audit team with evidence of the reduction of discard levels at the third surveillance visit,</p>
<b>Consultation condition</b>	<p><b>on</b></p> <p>All required actions are for the client, who is involved with ongoing consultation with LNV, Lowestoft &amp; Urk POs, Productshap Vis and North Sea RAC on this matter.</p>

## 14.2 Recommendation

### Recommendation 1: Clarification on reference points

As outlined in section 5.3:

There is a discrepancy between the ICES/ACOM advice which implies an  $F_{\max}$  of 0.17 and the EU and STECF advice for long term management which specifies an  $F=0.3$  to achieve MSY. The value of 0.3 was determined by the ICES *ad hoc* Group on Long Term Management Advice (AGLTA) and was adopted by the EU in its multi-annual plan for plaice and sole (Council Regulation (EC) No 676/2007). The plan specifies that  $F_{0.3}$  is consistent with exploitation of stocks of plaice “on the basis of maximum sustainable yield”. The use of a very low  $F_{\max}$  value such as 0.17 would result in an equilibrium stock in excess of 1 million tonnes. This is more than twice the size of the largest stock observed in the historical time series back to 1957. The assessors considered that the  $F_{0.3}$  specified by AGLTA and adopted by the EU was an appropriate candidate for MSY for this review.

The Assessment Team recognises the detailed consideration given by STECF to inform the long term management plan establishing  $F=0.3$  to achieve MSY. However the situation is confused at present with additional or alternative reference points reported in annual ICES advice. We appreciate this is outside the control of the UoC. However for the purposes of ongoing management planning and to ensure continued compliance with MSC criteria, we suggest that the client seeks further clarification via its representative bodies, including at North Sea RAC level.

### Client Action Plan

- 5.1. Osprey Group will liaise with its fishing industry representatives and discuss the fact that the current management plan for plaice and sole is using  $F=0.30$  whereas in Ices advice  $F=0.17$  is mentioned as the reference point for reaching MSY.
- 5.2. Industry representatives will be asked to seek clarification for this discrepancy through North Sea RAC.
- 5.3. Osprey Group will provide the audit team of evidence of actions taken in this matter at the first surveillance audit.

## **15 APPENDIX A**

### **Scoring Table**

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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Principle 1	A fishery must be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery.			
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1.1	Management Outcomes:			
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1.1.1	<b>Stock Status:</b> The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing	It is <u>likely</u> that the stock is above the point where recruitment would be impaired.	It is <u>highly likely</u> that the stock is above the point where recruitment would be impaired.  The stock is at or fluctuating around its target reference point.	There is a <u>high degree of certainty</u> that the stock is above the point where recruitment would be impaired.  There is a <u>high degree of certainty</u> that the stock has been fluctuating around its target reference point, or has been above its target reference point, <u>over recent years</u> .
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<b>Scoring Comments</b>				
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Based on the most recent estimate of SSB (in 2009) and fishing mortality (in 2008), ICES classifies the stock as having full reproductive capacity and as being harvested sustainably (ICES 2009). SSB is estimated to have increased from below the precautionary reference level ( $B_{pa}$ ) of 230,000t in 2004 to 390,000t in 2009. Although the precise level of the stock is uncertain, it is evident that the stock has increased considerably and this is in line with industry views (North Sea Commission fisher's survey, 2008). Additional validation of stock status was provided by ICES from a statistical catch at age (SCA) model (ICES WG 2009a). The SCA model estimates similar stock trends compared to the XSA model accepted by ICES and indicates that there is a 95% probability that the SSB is above the precautionary level and there is a high degree of certainty of it being above  $B_{lim}$  (the level of impaired recruitment). This meets the requirements of SG100.

No biomass target has been identified but there is an implicit target of  $B_{msy}$ . The SSB is estimated to be at 390,000t in 2009 which is below the  $B_{msy}$  (>500,000t) and is therefore not yet at a level consistent with  $B_{msy}$ . It does not meet the requirements of SG 80

<b>Score: 75</b>				
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The stock status exceeds the requirements of SG80 on the first scoring issue but not on the second, resulting in a score of 75 This triggers the need to score the stock under P1.1.3 (Stock rebuilding).

<b>Audit Trace References</b>				
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ICES 2009a , ICES 2009b  
North Sea Commission fisher's survey, 2008  
Council Regulation (EC) No 676/2007 (

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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1.1.2	<b>Reference Points:</b> Limit and target reference points are appropriate for the stock.	<p><u>Generic</u> limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.</p>	<p>Reference points are appropriate for the stock and can be estimated.</p> <p>The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.</p> <p>The target reference point is such that the stock is maintained at a level consistent with <math>B_{MSY}</math> or some measure or surrogate with similar intent or outcome.</p> <p>For low trophic level species, the target reference point takes into account the ecological role of the stock.</p>	<p>Reference points are appropriate for the stock and can be estimated.</p> <p>The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of relevant <u>precautionary issues</u>.</p> <p>The target reference point is such that the stock is maintained at a level consistent with <math>B_{MSY}</math> or some measure or surrogate with similar intent or outcome, <u>or a higher level</u>, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.</p>
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Scoring Comments
<p>ICES is committed to working within a precautionary framework. Limit and precautionary reference points have been set for both biomass and fishing mortality. All reference points have a firm technical basis and have been rigorously tested statistically to support their validity and to quantify uncertainty. The current reference points were established in 2004 when discard estimates were included in the assessment for the first time (ICES 2005). There is no clear breakpoint in the stock and recruitment relationship which could be used to establish Blim based on a low SSB at which recruitment would be impaired. Blim was therefore set at 160,000t, the lowest observed biomass, in 1997, as assessed retrospectively in 2004. The precautionary level (Bpa) is set at a level which gives reasonable certainty that the stock will stay above Blim. Bpa is 230,000t which is 1.4x Blim. Flim of 0.74 is based on Floss for ages 2-6 and Fpa (0.6) is statistically linked to this. Yield and spawning biomass per recruit reference points are also specified for Fmax, F0.1 and Fmed. This satisfies the 1st scoring guideline at 100.</p> <p>The biomass limit reference point is set at Blim. As there was no evidence of a breakpoint in the stock-recruit relationship, Blim has been set at the lowest observed SSB at which recruitment does not appear to have been reduced. Flim is the fishing mortality estimated to lead to SSB falling below Blim in the long term. This satisfies the 2<sup>nd</sup> scoring point at 80 but not at 100.</p> <p>Although the EU Management Plan is designed to ensure that the exploitation of plaice is on the basis of maximum sustainable yield, the long term target <math>F = 0.3</math> is above the Fmax (0.17) considered by ICES to consistent with MSY. The stock is not yet considered to be maintained at a level consistent with Bmsy. Therefore, the SG80 is not met.</p> <p>Plaice is a predator of fish and benthos and consequently, ecological considerations relating to low trophic level stocks do not apply here.</p>
<b>Score: 75</b>

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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Two of the three relevant scoring issues have been met at SG80 or above. A score of 75 is therefore appropriate

There does, however, appear to be some discrepancy between the reference points used in STECF advice and ICES Working Group advice. The Assessment Team recommends the fishery asks the relevant management scientific bodies for clear guidance on this issue to inform ongoing management of the fishery and future surveillance audits to ensure MSC criteria continue to be met.

#### **Audit Trace References**

ICES 2009a  
ICES 2009b  
Council Reg (EC) No. 676/2007

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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1.1.3	<b>Stock Rebuilding:</b> Where the stock is depleted, there is evidence of stock rebuilding.	<p>Where stocks are depleted rebuilding strategies which have a <u>reasonable expectation</u> of success are in place.</p> <p>Monitoring is in place to determine whether they are effective in rebuilding the stock within a <u>specified</u> timeframe.</p>	<p>Where stocks are depleted rebuilding strategies are in place.</p> <p>There is <u>evidence</u> that they are rebuilding stocks, or it is highly likely based on simulation modelling or previous performance that they will be able to rebuild the stock within a <u>specified</u> timeframe.</p>	<p>Where stocks are depleted, strategies are <u>demonstrated</u> to be rebuilding stocks continuously and there is strong evidence that rebuilding will be complete within the <u>shortest practicable</u> timeframe.</p>
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Scoring Comments	
<p>A building strategy is in place reflected in the EU Multi-annual plan (EC Reg. 676/2007). This meets the requirements of SG80.</p> <p>There is clear evidence from the stock status (see P1.1.1) that stocks are rebuilding towards MSY. Although no time frame is specified, an implicit deadline of 2015 is assumed following adoption by the EU of the World Summit on Sustainable Development in Johannesburg (2002). However, a recent analysis of a range of fish stocks including NS plaice questioned whether this time frame was achievable (Froese &amp; Proelß, 2010) and so it unlikely to meet the requirements of SG 100.</p>	
<b>Score: 85</b>	
<p>The requirements of the first scoring issue are met at SG 80 and whilst a timeframe is specified, there is reasonable doubt over whether it will be achieved in the shortest practicable timeframe and so does not meet the requirement for SG100 but exceeds that at SG80</p>	
Audit Trace References	
<p>Council Reg (EC) No. 676/2007 Froese &amp; Proelß, 2010</p>	



1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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1.2	Harvest Strategy (management)			
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1.2.1	Harvest Strategy: There is a robust and precautionary harvest strategy in place	<p>The harvest strategy is <u>expected</u> to achieve stock management objectives reflected in the target and limit reference points.</p> <p>The harvest strategy is <u>likely</u> to work based on prior experience or plausible argument.</p> <p><u>Monitoring</u> is in place that is expected to determine whether the harvest strategy is working.</p>	<p>The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy <u>work together</u> towards achieving management objectives reflected in the target and limit reference points.</p> <p>The harvest strategy may not have been fully tested but monitoring is in place and <u>evidence</u> exists that it is achieving its objectives.</p>	<p>The harvest strategy is responsive to the state of the stock and is <u>designed</u> to achieve stock management objectives reflected in the target and limit reference points.</p> <p>The performance of the harvest strategy has been <u>fully evaluated</u> and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.</p> <p>The harvest strategy is <u>periodically reviewed and improved</u> as necessary.</p>
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### Scoring Comments

The harvest strategy is consistent with the precautionary approach by ensuring biomass remains above a level where recruitment would be impaired. In the short term, it is responsive to the state of the stock and fishing mortality has been progressively reduced as the SSB dropped towards Bpa. In the longer term, the management plan (Council Regulation (EC) No. 676/2007 – see section 5.3) is intended to move SSB progressively towards Bmsy. The EC management plan has two stages. The first stage aims at an annual 10% reduction of fishing mortality in relation to the fishing mortality estimated for the preceding year until an F of 0.3 is reached, with a maximum change in TAC of 15% until the precautionary reference points are reached for both plaice and sole for two successive years. In the second stage, the management plan aims for exploitation at  $F = 0.3$  which ensures the exploitation of plaice at MSY.

ICES undertook an evaluation of the EC management plan and identified a number of shortcomings. These were a lack of robustness to the starting values of population abundance, systematic over-estimation of historic landings and under-estimation of bias and variance in the model. Until these aspects have been more fully examined, ICES was not able to reach a firm conclusion on the precautionary nature of the management plan for plaice. In the meantime, routine monitoring of the state of the stock is undertaken through collection of fisheries data, and fisheries independent surveys and through annual assessments. The maintenance of SSB well above precautionary levels is evidence that it is achieving its objectives.

### Score: 85

The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points. The harvest strategy may not have been fully tested but monitoring is in place and evidence exists that it is achieving its objectives.

### Audit Trace References

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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Council Regulation (EC) No. 676/2007 see ICES 2009a

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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1.2.2	Harvest control rules and tools: There are well defined and effective harvest control rules in place	<p><u>Generally understood</u> harvest control rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.</p> <p>There is <u>some evidence</u> that tools used to implement harvest control rules are appropriate and effective in controlling exploitation.</p>	<p><u>Well defined</u> harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.</p> <p>The <u>selection</u> of the harvest control rules takes into account the <u>main</u> uncertainties.</p> <p><u>Available evidence indicates</u> that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules</p>	<p><u>Well defined</u> harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.</p> <p>The <u>design</u> of the harvest control rules take into account a <u>wide</u> range of uncertainties.</p> <p><u>Evidence clearly shows</u> that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.</p>
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<p><b>Scoring Comments</b></p> <p>The harvest control rules are set out under the EC management plan for flatfish (section 5.3). The main mechanisms to contain the harvest of North Sea plaice are capacity restrictions and the setting of an annual TAC under agreement between the EU and Norway. The TAC is determined by selecting a fishing mortality that will ensure the spawning stock biomass will remain above precautionary levels. Under the current level of declining fleet capacity, TACs appear to be sufficient to control the level of fishing mortality.</p> <p>Declining fishing mortality and increasing SSB in recent years in addition to maintenance of SSB above Bpa are all indications that the harvest control rules are appropriate and effective. The TAC has not been exceeded since 2001 which provides further evidence that the control mechanisms are working.</p> <p>The use of target biomass and mortality reference points ensures that uncertainty is considered in the harvest control rules. However, the current assessment model (XSA) does not incorporate uncertainty in the input data such as landings and discard estimates and so these uncertainties are not directly taken into account by the harvest control rules. In the case of the most recent plaice assessment, an additional statistical model (SCA) which does allow for observational error was also carried out and showed a similar trend in SSB to that from the standard XSA model. The model also showed that the median and 95% confidence bounds were above Bpa.</p> <p>The declining fishing mortality, strong increase in SSB and the maintenance of SSB well above Bpa for a number of years is clear evidence that rules in force are effective in achieving the exploitation levels required under the harvest control rules.</p> <p><b>Score: 85</b></p> <p><u>Well defined</u> harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached; The <u>selection</u> of the harvest control rules takes into account the <u>main</u> uncertainties; <u>Evidence clearly shows</u> that the tools in use are effective in achieving the exploitation levels required under the</p>
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1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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harvest control rules.
<b>Audit Trace References</b>
Council Regulation (EC) No. 676/2007 see ICES 2009a

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
1.2.3	<b>Information / monitoring:</b> Relevant information is collected to support the harvest strategy	<p><u>Some</u> relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.</p> <p>Stock abundance and fishery removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.</p>	<p><u>Sufficient</u> relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.</p> <p>Stock abundance and fishery removals are <u>regularly monitored at a level of accuracy and coverage consistent with the harvest control rule</u>, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule.</p> <p>There is good information on all other fishery removals from the stock.</p>	<p>A <u>comprehensive range</u> of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.</p> <p><u>All information</u> required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of the inherent <u>uncertainties</u> in the information [data] and the robustness of assessment and management to this uncertainty.</p>

### Scoring Comments

There is extensive data to support the harvest strategy and control rules, including information on fleet structure, amount of the landings and age compositions of both landings and discards. All plaice landings are recorded by all countries participating in the North Sea flatfish and mixed demersal fisheries. The four vessels in the fishery under assessment put all their landings through the electronic fish auctions which ensures that all data is made available to the authorities. The accuracy of landings data is continually monitored at national level and enforcement action taken against individuals where appropriate. The WGNSSK have not identified any problems in relation to the validity of these data. The landings are also well sampled by the participating countries who fully comply with the EU minimum sampling levels. Data on landings by sex are available from Netherlands and Belgium accounting for approximately 50% of the landings. Length at age, weight at age and maturity are available for the Netherlands, France, Germany, Denmark and Belgium, accounting for approximately 75% of the landings.

Stock abundance is regularly monitored through fisheries dependent and independent data. LPUE are available for the Dutch beam trawl fleet and the UK beam trawl fleet (excluding foreign flagged vessels). These have been used in exploratory analyses but not yet in the final assessment because of potential inconsistencies and unreliability of the data related to quota restrictions, fleet changes and changes in fishing patterns.

Three time series of fishery independent tuning indices are currently used in the stock assessment. They consist of two Dutch research vessel surveys using an 8m beam trawl with 40mm mesh codend. One survey, begun in 1985 covers the south-eastern part of the North Sea (BTS-Isis) and the other, started in 1996, covers the central North Sea (BTS-Tridens). Up to 2001 both surveys were used as tuning indices for plaice age groups 1-4 but since 2001 age groups up to 9 have been included. A third Dutch survey the sole net survey (SNS) is carried out in September/October using a 6m beam trawl with 40mm mesh codend. This survey is targeted at juveniles, with transects perpendicular to the coast. It provides a time series of tuning data back to 1990 for plaice ages 1-3 for the assessment and a '0' group index for the estimation of recruitment.

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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Additional commercial information comes from a fishermen's survey which gives an independent perception of abundance and also includes a self sampling discard programme. There is an extensive programme of market sampling of the landings which provides an estimate of age composition by sex and by quarter. Commercial LPUE data from the Dutch beam trawler fleet and the UK beam trawler fleet (excluding flagged vessels) is also used in exploratory runs in the assessment. All these indices are subject to rigorous scrutiny each year, by the assessment working group, and any uncertainties identified and addressed. As a result there have been several changes in the way that the indices are used and the time periods considered appropriate.

Discards of juvenile plaice are a major problem in the plaice fishery and observations indicate that the proportions discarded are up to 80% in number and 50% in weight (Grift et al., 2004a; van Keeken et al., 2004a,b) and have increased in recent years. Data on plaice discards are derived from a limited programme of observer trips on Dutch, Danish, German and UK vessels for 2000-2008. For the period prior to that, a reconstructed discard time series is used covering the period 1957-1999. Overall sampling is low and does not cover all parts of the fishery but sampling trips, particularly in the Netherlands, have recently been increased. None of the previous discard monitoring programmes covers any part of the fishery under assessment but samples are expected to be collected during 2010. Discarding is a particular problem in the beam trawl fisheries which are traditionally targeted at sole and use an 80mm mesh size. Limited studies have shown that discarding of plaice from twin rig otter trawls is generally much lower than from beam trawlers (see data in section 4.3.2; van Keeken et al., 2004a;Grift et al., 2004).

Sufficient information is available on the fishery (UoC) to allow accurate estimates to be made of landings, but the estimates of discarding of plaice from this small fleet are not well known. The limited evidence available suggests that discard rates will generally be much lower than for beam trawling and in view of the relatively small scale of the fishery, the overall level of discarding for plaice would be expected to be very small compared with the large discards from other fleets.

#### Score: 70

The sampling and data collection for this stock is very good and in most aspects would be regarded as reaching scoring guidepost 80. However the shortfall on discard sampling has been noted by ICES and by the WG and results in additional uncertainties in the assessment which are considered sufficient to reduce the scoring below 80.

#### Audit Trace References

ICES. 2009a  
ICES 2009b  
section 4.3.2 this report  
Grift et al., 2004a  
van Keeken et al., 2004a

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
1.2.4	<b>Assessment of stock status:</b> There is an adequate assessment of the stock status	<p>The assessment estimates stock status relative to reference points.</p> <p>The assessment identifies major sources of uncertainty.</p>	<p>The assessment is appropriate for the stock and for the harvest control rule, and is evaluating stock status relative to reference points.</p> <p>The assessment takes uncertainty into account.</p> <p>The assessment of stock status is subject to peer review.</p>	<p>The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.</p> <p>The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.</p> <p>The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.</p> <p>The assessment has been <u>internally and externally</u> peer reviewed.</p>

### Scoring Comments

The assessment model used for this stock is based on an aged based extended survivors analysis (XSA), using landings and discards and calibrated with three fisheries independent survey indices. The XSA model has been used within ICES as an important tool for catch-at-age analysis for most demersal stocks. Careful consideration is given by the WGNSSK each year to the appropriateness of all aspects of the model parameters in relation to each species and these are detailed in the WG reports.

Alternative hypotheses and assessment approaches have been explored. One approach which has provided additional validation of the existing XSA analysis is a statistical catch at age (SCA) model (ICES WG 2009) which explicitly incorporates the discard reconstruction into the assessment (Aarts and Poos 2009). The new aspect of the proposed method is that it does not assume constant fishing and selectivity in time, but explicitly models the fishing and discard selectivity as a flexible function of time using spline smoothers. The proposed statistical catch at age model includes data on landings and discards separately, and therefore explicitly allows for observation errors on those, and other data sources. The SCA model estimates similar stock trends compared to the XSA model accepted by ICES and indicates that there is a 95% probability that the SSB is above the precautionary level.

While the assessment is considered to be the best basis for advice, there are uncertainties in the assessment which are recognized and addressed. Discards form a substantial part of the total catch and in the past have not been well estimated due to low sampling intensity. Also, the three survey tuning series in overlapping areas of the North Sea have indicated different trends in the most recent development of the stock. This uncertainty is compounded by a relatively strong retrospective pattern, with this years' assessment estimating a considerably higher SSB and lower fishing mortality for the most recent years. The assessment process has satisfactorily informed the management process and enabled decisions on TAC and fishing mortality to be made within a precautionary framework. The current state of the stock and the low fishing mortality is indicative that the assessment is appropriate for the stock and the harvest control rule.

In recent years, the assessment has included age compositions of the discards. This has resulted in a more robust assessment and a reduction in bias but because of the low level of discard

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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sampling has resulted in increased uncertainty.

ICES advice is peer reviewed both internally and externally and is subsequently reviewed by the EC Scientific Technical and Economic Committee for Fisheries (STECF).

**Score: 90**

The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery; The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored; The assessment has been internally and externally peer reviewed;

**Audit Trace References**

ICES. 2009a  
ICES 2009b  
Aarts and Poos, 2009



1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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Principle 2	Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends			
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2.1	Retained non-target species			
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2.1.1	<p><b>Status:</b> The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species.</p>	<p>Main retained species are <u>likely</u> to be within biologically based limits or if outside the limits there are <u>measures</u> in place that are <u>expected</u> to ensure that the fishery does not hinder recovery and rebuilding of the depleted species.</p> <p>If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the retained species to be outside biologically based limits or hindering recovery.</p>	<p>Main retained species are <u>highly likely</u> to be within biologically based limits, or if outside the limits there is a <u>partial strategy</u> of <u>demonstrably effective</u> management measures in place such that the fishery does not hinder recovery and rebuilding.</p>	<p>There is a <u>high degree of certainty</u> that retained species are within biologically based limits.</p> <p>Target reference points are defined and retained species are at or fluctuating around their target reference points.</p>
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<b>Scoring Comments</b>				
<p>From 2009 data provided on fish species retained by two of the vessels in the UoC (see Table 2), the main retained species (defined as comprising more than 5% of the total catch by weight), other than plaice, are lemon sole and dab. Both lemon sole and dab in the North Sea are non-quota species and are managed by precautionary TAC based on the average of the last 3 years landings. The precautionary TAC for lemon sole (+witch) in 2009 was 6,793 tonnes and for dab (+flounder) was 18,810 tonnes. Compared with the precautionary TAC levels, the catch of the UoC vessels is relatively low: approx. 47 to 66 tonnes. There are however no formal assessments for these species so population estimates from the North Sea are lacking. WGNEW in 2007 did review available data for these species. Recent trends in the CPUE for both lemon sole and dab in the IBTS research survey suggest that they have increased in numbers in recent years in the North Sea.</p>				
<p>Score 70 There is some evidence that the stocks of dab and lemon sole are in good shape and the score lies between the 60 (Main retained species are likely to be within biologically based limits) and 80 guideposts (Main retained species are highly likely to be within biologically based limits).</p>				
<p>Based on the 2009 landings data, minor retained species (which comprised less than 5% of total catch by weight) included cod, turbot, grey gurnard, whiting, brill, red gurnard, Nephrops, sole, mackerel, haddock, pollack, rays (mixed), mullet and flounder. Because of the conservation concerns over North Sea cod we also included this species under main retained species.</p>				
<p>The status of the cod stock in the North Sea is of particular concern and it is listed under OSPAR (see separate comments under the ETP sections of this report). For this reason the catches of cod by the UoC, even though small, need to receive some attention. Currently the scientific advice is that although SSB has increased from the low of 2006, it is still below <math>B_{lim}</math> (ICES WG, 2009). Cod re-building is currently managed under the European Council cod management plan. This plan includes a target fishing mortality of 0.4 (EC 1342/2008) and the 2009 cod quota was set at 28,798 tonnes by the EU Commission. In 2009 the UoC landings data provided to the assessment team indicate landings of around 9 tonnes of cod per vessel against this quota. The UoC voluntarily take measures such as use of lowered headline to reduce the amount of cod caught and fish in an area where cod are currently not common. Data from comparable fisheries suggest</p>				

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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cod discard rates in twin-rig trawl fisheries are low although this may vary with the area fished. On this basis it is unlikely that the levels of cod landed by the UoC will have a significantly negative impact on cod rebuilding and the UoC is taking measures that are expected to ensure that the fishery does not hinder recovery and rebuilding of this depleted species. Condition 2 will also address this issue. There is some evidence that the EU Cod Recovery Plan is working as SSB has recently shown an increase. Guidepost for 80 'there is a partial strategy of demonstrably effective management measures in place such that the fishery does not hinder recovery and rebuilding.'

Averaging scores of 70 and 80 gives an overall score of 75

**Score:75**

#### **Audit Trace References**

Chevolot et al. (2006); Ellis et al. (2008); ICES (2007); Jak et al. (2009); Walker & Heessen (1996); Walker & Hislop (1998)

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
2.1.2	<p><b>Management strategy:</b> There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species.</p>	<p>There are <u>measures</u> in place, if necessary, that are expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.</p> <p>The measures are considered <u>likely</u> to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).</p>	<p>There is a <u>partial strategy</u> in place, if necessary that is expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.</p> <p>There is some <u>objective basis for confidence</u> that the partial strategy will work, based on some information directly about the fishery and/or species involved.</p> <p>There is <u>some evidence</u> that the partial strategy is being <u>implemented successfully</u>.</p>	<p>There is a <u>strategy</u> in place for managing retained species.</p> <p>The strategy is mainly based on information directly about the fishery and/or species involved, and <u>testing</u> supports <u>high confidence</u> that the strategy will work.</p> <p>There is <u>clear evidence</u> that the strategy is being <u>implemented successfully</u>, and intended changes are occurring.</p> <p>There is some evidence that the strategy is <u>achieving its overall objective</u>.</p>

### Scoring Comments

Based on 2009 landings data supplied by the UoC, the main retained non-target species are dab and lemon sole. These species is not formally assessed in the North Sea but are considered to be abundant on the basis of data from the International Bottom Trawl Survey and are managed by precautionary TAC which appears to be maintaining populations within biologically based limits.

Other non-target retained species include a range of formally assessed and non-assessed species including cod . Of particular concern in the North Sea is the status of cod and some of the ray species particularly thornback ray. There is a stock rebuilding strategy for cod (EU Cod Recovery Plan). The latest ICES assessment shows signs that cod spawning stock biomass is beginning to rebuild in the North Sea although it is still below  $B_{lim}$ . Current  $F$  lies between  $F_{lim}$  and  $F_{pa}$ .

There are partial strategies in place for managing the main retained species (dab, lemon sole) based on precautionary TACs and there is some objective basis for confidence that these strategies are working, recent trends in the CPUE for both lemon sole and dab in the IBTS research survey suggest that they have increased in numbers in recent years in the North Sea. There is some evidence that the partial strategy is being implemented successfully (Score 80). For cod there is a strategy in place (Cod Recovery Plan).. The strategy is mainly based on information directly about the fishery and/or species involved, and testing supports high confidence that the strategy will work. For cod there is some evidence that the strategy is achieving its overall objective in that SSB has begun to rebuild. (Score 90). Averaging the two scores gives overall score of 85.

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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Score: 85
Audit Trace References
Commission of the European Communities (2009)

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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2.1.3	<p><b>Information / monitoring:</b> Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species.</p>	<p><u>Qualitative information</u> is available on the amount of main retained species taken by the fishery.</p> <p>Information is <u>adequate</u> to <u>qualitatively</u> assess outcome status with respect to biologically based limits.</p> <p>Information is adequate to support <u>measures</u> to manage <u>main</u> retained species.</p>	<p><u>Qualitative information</u> and some quantitative information are available on the amount of main retained species taken by the fishery.</p> <p>Information is <u>sufficient</u> to estimate outcome status with respect to biologically based limits.</p> <p>Information is adequate to support a <u>partial strategy</u> to manage <u>main</u> retained species.</p> <p>Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy).</p>	<p>Accurate and verifiable information is available on the catch of all retained species and the consequences for the status of affected populations.</p> <p>Information is <u>sufficient</u> to <u>quantitatively</u> estimate outcome status with a <u>high degree of certainty</u>.</p> <p>Information is adequate to support a <u>comprehensive strategy</u> to manage retained species, and evaluate with a <u>high degree of certainty</u> whether the strategy is achieving its objective.</p> <p>Monitoring of retained species is conducted in sufficient detail to assess ongoing mortalities to all retained species.</p>
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### Scoring Comments

Landings data for the main retained species (lemon sole and dab) and minor retained species are recorded by the UoC (standard logsheets).

The IMARES discard sampling program is on-going and along with Conditions 2 and 3 will increase the amount of data on discarding available in the twin-rig otter trawl fisheries. Data from the IMARES discard program are currently being used to support management strategies for the retained species.

Literature data show that the mesh sizes used by the UoC will retain undersized cod and this could lead to discarding. In a discards observer trip on twin-rig trawlers Van Keeken (2003) reported low levels of cod were discarded (2 and <1 per hour fishing) but this conclusion was based on a limited number of trips. The UoC fish using trawls with low headlines to reduce the amount of cod caught and fish in areas where cod are not at present abundant. If the cod stock does begin to recover substantially, cod discarding may become a more important issue in the UoC and cod catch could move from a minor retained to a main retained species.

Qualitative information and some quantitative information are available on the amount of main retained species taken by the fishery.

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
	<p>Information is sufficient to estimate outcome status with respect to biologically based limits.</p> <p>Information is adequate to support a <u>partial strategy</u> to manage <u>main</u> retained species (dab, lemon sole and cod).</p> <p>Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy) although improved data collection on discards is required to ensure this does not become a problem if stock status changes (for example if the amount of juvenile cod in the fished areas increased).</p>			
	<b>Score: 85</b>			
	<b>Audit Trace References</b>			
	<p>Landings records</p> <p>Horwood et al. (2006); O'Neill &amp; Herrmann (2007); Van Keeken (2003)</p>			

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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2.2	Discarded species (also known as “by-catch” or “discards”)			
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2.2.1	<p><b>Status</b> The fishery does not pose a risk of serious or irreversible harm to the by-catch species or species groups and does not hinder recovery of depleted by-catch species or species groups.</p>	<p>Main by-catch species are <u>likely</u> to be within biologically based limits, or if outside such limits there are mitigation <u>measures</u> in place that are <u>expected</u> to ensure that the fishery does not hinder recovery and rebuilding.</p> <p>If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the by-catch species to be outside biologically based limits or hindering recovery.</p>	<p>Main by-catch species are <u>highly likely</u> to be within biologically based limits or if outside such limits there is a <u>partial strategy</u> of <u>demonstrably effective</u> mitigation measures in place such that the fishery does not hinder recovery and rebuilding.</p>	<p>There is a <u>high degree of certainty</u> that by-catch species are within biologically based limits.</p>
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Scoring Comments	
<p>Discarded species considered here are non-commercial, discarding of under-sized retained species is dealt with under 2.1.1 to 2.1.3.</p> <p>There is little specific data on discards for the UoC. The twin-rig fishery for plaice has developed relatively recently and the discard sampling programs run by IMARES and Cefas have not yet sampled this metier to any great extent. Van Keekan (2004) provides some data on levels of discards in a North Sea twin-rig plaice fishery. These data show discards to be of common species such as starfish (<i>Asterias rubens</i>), sand star, brittle star, swimming crab, spider crab, hermit crab and heart urchin. The data also show low levels of discards of all these taxa in the twin-rig catches compared with beam trawl catches. In the twin-rig fishery on average 80-500 animals per hour were discarded whereas this varied in the beam trawl fishery between 3000-5200 per hour. Oral evidence presented (IMARES Discard sampling team) suggest that catches in the twin-rig fishery are generally clean and that they try to minimise by-catch and discards as it will reduce the quality of the catch. The levels of discards are however likely to be slightly higher when using a 95 mm mesh compared with 110 + mm mesh. Based on these rates and typical organism weights, as a proportion of likely total catch, benthic discards can be regarded as minor by-catch and will not be of major concern.</p> <p>Relevant OSPAR Annex 1 marine benthos species which occur in the fished area and may interact with the fishery include ocean quahog (<i>Arctica islandica</i>). Although catch rates would likely make this a minor by-catch species, because it is considered to be vulnerable it is given further consideration in this section. Species abundance levels for benthic species have been periodically surveyed across the wider North Sea and more detailed surveys of benthos have been conducted within proposed SAC areas as part of the national programs for defining Natura2000 sites. As part of the Natura2000 site management plans it is likely that the conservation status of these species will be monitored more regularly within the sites.</p> <p>For by-catch species outside biological limits (<i>Arctica islandica</i>) there is a <u>partial strategy</u> (designation of SACs within the Natura2000 program) of <u>demonstrably effective</u> mitigation measures</p>	

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
in place such that the fishery does not hinder recovery and rebuilding. In addition the UoC voluntarily have agreed to avoid fishing in areas being nominated or designated as SACs. The fishery will therefore not hinder recovery and rebuilding of stocks of this species.				
<b>Score: 80</b>				
<b>Audit Trace References</b>				
Jak (2009); JNCC (2008b); Nordheim et al., (2006); Van Keeken et al. (2004b)				



1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
2.2.2	<p><b>Management strategy:</b> There is a strategy in place for managing by-catch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to by-catch populations.</p>	<p>There are <u>measures</u> in place, if necessary, which are expected to maintain main by-catch species at levels which are highly likely to be within biologically based limits or to ensure that the fishery does not hinder their recovery.</p> <p>The measures are considered <u>likely</u> to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/species).</p>	<p>There is a <u>partial strategy</u> in place, if necessary, for managing by-catch that is expected to maintain main by-catch species at levels which are highly likely to be within biologically based limits or to ensure that the fishery does not hinder their recovery.</p> <p>There is <u>some objective basis for confidence</u> that the partial strategy will work, based on some information directly about the fishery and/or the species involved.</p> <p>There is <u>some evidence</u> that the partial strategy is being implemented successfully.</p>	<p>There is a <u>strategy</u> in place for managing and minimising by-catch.</p> <p>The strategy is mainly based on information directly about the fishery and/or species involved, and testing supports <u>high confidence</u> that the strategy will work.</p> <p>There is some <u>evidence</u> that the strategy is achieving its objective.</p> <p>There is <u>clear evidence</u> that the strategy is being implemented successfully, and intended changes are occurring.</p>

Scoring Comments
<p>Evidence on by-catch species indicates these are mainly common and widely dispersed species, which have not required a management strategy.</p> <p>For other potential by-catch species considered vulnerable (<i>Arctica islandica</i>) there is a management strategy (OSPAR MPA network and Natura2000) in place.</p> <p>There is a partial strategy in place for managing by-catch that is expected to maintain main by-catch species at levels which are highly likely to be within biologically based limits or to ensure that the fishery does not hinder their recovery.</p> <p>There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or the species involved.</p> <p>There is some evidence that the partial strategy is being implemented successfully in that Natura2000 sites are being surveyed, nominated and designated.</p>

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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Score: 80
Audit Trace References
Van Keeken (2004b); Jak (2009); JNCC (2008b)

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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2.2.3	<p><b>Information monitoring</b></p> <p>Information on the nature and amount of by-catch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage by-catch.</p>	<p><u>Qualitative information</u> is available on the amount of main by-catch species affected by the fishery.</p> <p>Information is <u>adequate</u> to <u>broadly understand</u> outcome status with respect to biologically based limits.</p> <p>Information is adequate to support <u>measures</u> to manage by-catch.</p>	<p><u>Qualitative information and some quantitative information</u> are available on the amount of main by-catch species affected by the fishery.</p> <p>Information is sufficient to estimate outcome status with respect to biologically based limits.</p> <p>Information is adequate to support a <u>partial strategy</u> to manage main by-catch species.</p> <p>Sufficient data continue to be collected to detect any increase in risk to main by-catch species (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy).</p>	<p><u>Accurate and verifiable information</u> is available on the amount of all by-catch and the consequences for the status of affected populations.</p> <p>Information is <u>sufficient</u> to quantitatively estimate outcome status with respect to biologically based limits with a <u>high degree of certainty</u>.</p> <p>Information is adequate to support a <u>comprehensive strategy</u> to manage by-catch, and evaluate with a high degree of certainty whether a strategy is achieving its objective.</p> <p>Monitoring of by-catch data is conducted in sufficient detail to assess ongoing mortalities to all by-catch species.</p>
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Scoring Comments
<p>Anecdotal evidence was presented on main by-catch species and the amount of by-catch by the UoC to the audit team. Some literature data from other twin-rig otter trawl fisheries in the North Sea exist to support this. The IMARES discard sampling program is in place and vessels from the UoC have taken part in it. <u>Qualitative information and some quantitative information</u> are available on the amount of main by-catch species affected by the fishery. Information is adequate to broadly understand outcome status with respect to biologically based limits and the information is adequate to support measures to manage by-catch but the amount and coverage of the data need to be improved. Because the IMARES discard program is on-going this goes some way towards the 80 score criteria – ‘Sufficient data continue to be collected to detect any increase in risk to main by-catch species (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy)’.</p>
Score: 70
<p>Very little quantitative data on discards is available specific to the UoC. Condition 1 will address this for the UoC.</p>

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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Audit Trace References
Oral presentation; Van Keeken (2004b)

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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2.3	Endangered, Threatened and Protected (ETP) species			
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2.3.1	<p><b>Status:</b> The fishery meets national and international requirements for protection of ETP species.</p> <p>The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species.</p>	<p>Known effects of the fishery are <u>likely</u> to be within limits of national and international requirements for protection of ETP species.</p> <p>Known direct effects are <u>unlikely</u> to create <u>unacceptable impacts</u> to ETP species.</p>	<p>The effects of the fishery are known and are <u>highly likely</u> to be within limits of national and international requirements for protection of ETP species.</p> <p>Direct effects are <u>highly unlikely</u> to create <u>unacceptable impacts</u> to ETP species.</p> <p>Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts.</p>	<p>There is a <u>high degree of certainty</u> that the effects of the fishery are within limits of national and international requirements for protection of ETP species.</p> <p>There is a <u>high degree of confidence</u> that there are <u>no significant detrimental effects (direct and indirect)</u> of the fishery on ETP species.</p>
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<p><b>Scoring Comments</b></p> <p>The UoC twin-rig otter trawl fishery will not have impacts on seabirds foraging in the area as it does not catch sandeel. There are unlikely to be significant interactions with any of the deeper-water sharks or anadromous species on the OSPAR list. Interactions with cod have been dealt with under retained species rather than ETP in this report. Of the listed ray species only spotted and thornback ray occur commonly in the southern North Sea. These will be the only species likely to interact with the fishery. The UoC catches rays but in rather small amounts. Landings data are available but a species breakdown of the rays caught (including those discarded) is not available but this will be generated. Based on the example landings data given to the assessment team, landings of rays in 2009 by UoC vessels were 55 kg or less per vessel. In recent years the total UK landings (recorded as mixed skate) have been between 2,000 and 3,000 tonnes. Following adoption of the EU Action Plan for Conservation and Management of Sharks, landings must, in future, be recorded to species level. A new species identification key covering the North Sea is available from the Shark Trust (<a href="http://www.sharktrust.org">www.sharktrust.org</a>). A number of research projects have been or are being conducted on the biology of rays in the North Sea which will improve biological knowledge for these species, especially thornback ray (Hunter et al. 2005, Ellis et al. 2008).</p> <p>There are occasional records of spurdog (<i>Squalus acanthias</i>) from the southern North Sea but it is now more associated with waters to the west of the UK (EurOBIS). <i>Ostrea edulis</i> are currently uncommon (EurOBIS) offshore in the southern North Sea. There are no data on whether <i>Arctica islandica</i> or <i>Ostrea edulis</i> would be damaged by light twin-rig otter trawls.</p> <p>The effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species. The overall catch rates for rays strongly suggest that this level of catch will not affect these ETPs but better data do need to be gathered. Condition 2 will address this.</p>				
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1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
	<p>Direct effects are highly unlikely to create unacceptable impacts to ETP species because of the relatively low catch rates of listed species by the UoC although more data are needed on possible effects of the gear on <i>Arctica islandica</i>. The Natura 2000 network is being developed to address areas of concern e.g. <i>Arctica islandica</i>.</p> <p>Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts.</p>			
	<b>Score: 80</b>			
	<b>Audit Trace References</b>			
	CITES; OSPAR; <a href="http://www.sharktrust.org">www.sharktrust.org</a> ; <a href="http://www.marbef.org/data/eurobissearch.php">www.marbef.org/data/eurobissearch.php</a> ; Bergman & van Santbrink 2000; Heesen and Daan, 1996; Kaiser 1998; ten Hallers-Tjabbes et al. 1996; Witbaard & Bergman 2003			

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
2.3.2	<p><b>Management strategy</b></p> <p>The fishery has in place precautionary management strategies designed to:</p> <ul style="list-style-type: none"> <li>- meet national and international requirements;</li> <li>- ensure the fishery does not pose a risk of serious or irreversible harm to ETP species;</li> <li>- ensure the fishery does not hinder recovery of ETP species; and</li> <li>- minimise mortality of ETP species.</li> </ul>	<p>There are <u>measures</u> in place that minimise mortality, and are expected to be highly likely to achieve national and international requirements for the protection of ETP species.</p> <p>The measures are <u>considered likely</u> to work, based on <u>plausible argument</u> (eg general experience, theory or comparison with similar fisheries/species).</p>	<p>There is a <u>strategy</u> in place for managing the fishery's impact on ETP species, including measures to minimise mortality, that is designed to be highly likely to achieve national and international requirements for the protection of ETP species.</p> <p>There is an <u>objective basis for confidence</u> that the strategy will work, based on <u>information</u> directly about the fishery and/or the species involved.</p> <p>There is <u>evidence</u> that the strategy is being implemented successfully.</p>	<p>There is a <u>comprehensive strategy</u> in place for managing the fishery's impact on ETP species, including measures to minimise mortality, that is designed to achieve <u>above</u> national and international requirements for the protection of ETP species.</p> <p>The strategy is mainly based on information directly about the fishery and/or species involved, and a <u>quantitative analysis</u> supports <u>high confidence</u> that the strategy will work.</p> <p>There is <u>clear evidence</u> that the strategy is being implemented successfully, and intended changes are occurring. There is evidence that the strategy is achieving its objective.</p>

#### Scoring Comments

Protection of offshore habitats is being developed through the Natura2000 network. Although this is primarily designed to protect habitats (and Annex II species which are not so relevant to this fishery) it will use the status of indicator species to determine if good ecological status has been achieved. In some cases, selected indicator species will coincide with ETP species on the OSPAR list. The largest likely SAC which will be designated in ICES Division IVb is the Dogger Bank and it is likely that abundance of *Arctica islandica* and thornback ray may be used as indicators for this habitat (Sandbanks submerged all the time)(Jak et al. 2009). At present countries are at the stage of nominating sites which must be completed by 2012, if accepted and designated, management plans will need to be developed including monitoring the ecological status of the sites.

Following adoption of the EU Action Plan for Conservation and Management of Sharks, landings must, in future, be recorded to species level. A new species identification key covering the North Sea is available from the Shark Trust ([www.sharktrust.org](http://www.sharktrust.org)). A number of research projects have been or are being conducted on the biology of rays in the North Sea which will improve data, especially on thornback ray (Hunter et al. 2005, Ellis et al. 2008).

The UoC will abide with all legal conservation measures including any fisheries closed areas that may be established in ICES Division IVb.

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
<p>There is therefore a strategy in place (Natura2000) for managing the fishery's impact on ETP species principally by adopting a habitat protection route, including measures to minimise mortality, that is designed to be highly likely to achieve national and international requirements for the protection of ETP species.</p> <p>(Guideline score 60) The measures are considered likely to work (Guideline 80) There is <u>evidence</u> that the strategy is being implemented successfully as member states (UK, Holland and Germany) have nominated sites in the North Sea and carried out the required pre-nomination research but the network is not yet at a state where a score of 80 would be justified.</p>				
<b>Score: 75</b>				
<b>Audit Trace References</b>				
JNCC (2009); Jak (2009); Norheim et al. (2006)				



1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
2.3.3	<b>Information monitoring</b> Relevant information is collected to support the management of fishery impacts on ETP species, including: <ul style="list-style-type: none"> <li>- information for the development of the management strategy;</li> <li>- information to assess the effectiveness of the management strategy; and</li> <li>- information to determine the outcome status of ETP species.</li> </ul>	<p>Information is <u>adequate</u> to <u>broadly understand</u> the impact of the fishery on ETP species.</p> <p>Information is adequate to support <u>measures</u> to manage the impacts on ETP species</p> <p><u>Information</u> is sufficient to <u>qualitatively</u> estimate the fishery related mortality of ETP species.</p>	<p>Information is <u>sufficient</u> to determine whether the fishery may be a threat to protection and recovery of the ETP species, and if so, to measure trends and support a <u>full strategy</u> to manage impacts.</p> <p><u>Sufficient data</u> are available to allow fishery related mortality and the impact of fishing to be <u>quantitatively</u> estimated for ETP species.</p>	<p>Information is <u>sufficient</u> to <u>quantitatively</u> estimate outcome status with a high degree of certainty.</p> <p>Information is adequate to support a <u>comprehensive strategy</u> to manage impacts, minimize mortality and injury of ETP species, and evaluate with a high degree of certainty whether a strategy is achieving its objectives.</p> <p><u>Accurate and verifiable information</u> is available on the magnitude of all impacts, mortalities and injuries and the consequences for the status of ETP species</p>
<b>Scoring Comments</b> <p>Monitoring the status of ETP species in the North Sea is principally the responsibility of national agencies e.g. JNCC in the UK. The development of the Natura2000 network is likely to lead to improvements in the monitoring of ETP species population levels, at least within the proposed SACs.</p> <p>Information is adequate to broadly understand the impact of the fishery on ETP species – possible interactions have been identified.  Information is adequate to support measures to manage the impacts on ETP species – information is adequate but could be improved.</p> <p>Data on catches of rays by species needs to be collected. It is likely that impacts of twin-rig otter trawls used by the UoC on <i>Arctica islandica</i> will be less than for heavier beam trawls but these data do need to be improved. Information is sufficient to qualitatively estimate the fishery related mortality of ETP species. As some of the ETP species i.e. rays are retained, some quantitative information is available on these species to allow the impact of the fishery to be quantitatively estimated.</p>				
<b>Score: 65</b>				
<b>Audit Trace References</b>				
Jak et al. 2009, JNCC 2009				

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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2.4	Habitat
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2.4.1	<p><b>Status</b> The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function.</p>	<p>The fishery is <u>unlikely</u> to reduce habitat structure and function to a point where there would be serious or irreversible harm.</p>	<p>The fishery is <u>highly unlikely</u> to reduce habitat structure and function to a point where there would be serious or irreversible harm.</p>	<p>There is <u>evidence</u> that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.</p>
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Scoring Comments
<p>Habitats needing special protection are covered by the EU Habitats Directive and/or are included in the OSPAR List of threatened and/or Declining Habitats. For the North Sea (OSPAR Area II), listed habitats include Coral gardens; intertidal <i>Mytilus edulis</i> beds; intertidal mudflats; littoral chalk communities; <i>Lophelia pertusa</i> reefs; maerl beds; <i>Modiolus modiolus</i> beds, <i>Ostrea edulis</i> beds; <i>Sabellaria spinulosa</i> reefs; Sea-pen and burrowing megafauna communities and Zoostera (Seagrass) beds. Maps of the locations of these habitats are available at <a href="http://data.nbn.org.uk/hosted/ospar/ospar.html">http://data.nbn.org.uk/hosted/ospar/ospar.html</a>. Excluding the inter-tidal and shallow water habitats which will not be affected by the UoC, these maps show that the only likely interaction in ICES Division IVb would be with sea-pen and burrowing megafauna communities. The description for this habitat type is ‘Plains of fine mud, at water depths ranging from 15-200 m or more, which are heavily bioturbated by burrowing megafauna with burrows and mounds typically forming a prominent feature of the sediment surface.’ Since the UoC operates on sandy and muddy-sand bottoms there is unlikely to be interaction with this habitat.</p> <p>The UoC are experimenting with doors that do not contact the seabed (Thyboron Trawldoors, Denmark). If trials are successful the UoC will switch over to these doors to reduce seabed impacts further.</p> <p>The UoC fish using 3 to 4 light chain ticklers which is in contrast to beam trawls where heavy chains and chain mats are designed to dig into the sediment (at least 6 cm). On the twin-rigs, the chains are 13 mm – 10 mm diameter and are designed to roll over the seabed and encourage the plaice to rise up over the rollers and enter the net, rather than penetrating the sediment. The UoC maintained that the ticklers roll over the seabed and should cause only light disturbance to the top 1 or 2 cm. The ticklers have to be rigged using a swivel at each end to prevent them twisting – again this is evidence that they do roll over the sediment rather than digging in. In addition the gear is towed relatively slowly (2.8 - 3 knots over the ground). The rubbers have gaps between them and as explained above this allows benthos to pass under the footrope rather than entering the net.</p> <p>The sweeps of the gear deployed by the unit of certification are designed to vibrate causing some degree of sediment re-suspension but should not dig into the sediment. If the UoC trials with semi-pelagic doors prove successful and are adopted, the length of sweep in contact with the seabed would probably be reduced.</p> <p>The clump of the gear deployed by the unit of certification is a chain type. If deployed on muddy sediments this is likely to cause some impact. The clump is designed to skim, rather than dig into the seabed. Its purpose is to prevent the twin-nets separating. The degree of impact of clumps on sandy habitats has not been investigated but is likely to be relatively minor given the overall likely area of contact.</p> <p>The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm as it is confined to operating on sandy or muddy-sand seabed</p>

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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which is subject to high rates of natural disturbance.
Score: 80
Audit Trace References
Dr John Aldridge (Cefas) email; Client verbal data Bergman & Hup, 1992; Jak et al. 2009

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
2.4.2	<p><b>Management strategy</b></p> <p>There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types.</p>	<p>There are <u>measures</u> in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance.</p> <p>The measures are considered <u>likely</u> to work, based on plausible argument (e.g general experience, theory or comparison with similar fisheries/habitats).</p>	<p>There is a <u>partial strategy</u> in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above.</p> <p>There is some <u>objective basis for confidence</u> that the partial strategy will work, based on information directly about the fishery and/or habitats involved.</p> <p>There is <u>some evidence</u> that the partial strategy is being implemented successfully.</p>	<p>There is a <u>strategy</u> in place for managing the impact of the fishery on habitat types.</p> <p>The strategy is mainly based on information directly about the fishery and/or habitats involved, and testing supports high confidence that the strategy will work.</p> <p>There is <u>clear evidence</u> that the strategy is being implemented successfully, and intended changes are occurring. There is some evidence that the strategy is achieving its objective.</p>
<p><b>Scoring Comments</b></p> <p>Marine spatial planning to deliver habitat protection in the North Sea is being developed under the European Marine Strategy. Habitat protection will take place by designation of SACs which along with additional sites (at least in the UK sector) will lead to an ecologically coherent network of protected areas (the Natura 2000 network). The strategy includes a guideline that 20% of each habitat should be protected. It will then be up to national governments to ensure good ecological status for these areas, if necessary taking actions to restore habitats. For submerged sand-banks, a number of indicators are being proposed, for example the presence of healthy populations of long-lived species such as <i>Arctica islandica</i> and thornback ray would indicate good ecological status. There is therefore a partial strategy in place that is expected to achieve the Habitat Outcome 80 level of performance or above. The degree to which fisheries are allowed in SACs will be up to national governments and there may be some danger that different governments will adopt different standards. Problems may occur if trawling moves into previously unfished areas as a result of the introduction of closed areas and potential effort displacement should be carefully considered before spatial management measures are introduced.</p> <p>There is therefore some objective basis for confidence that the strategy will work. There is evidence that the strategy is being implemented successfully as sites have been identified by the UK, Holland and Germany and the process of nominating sites to the EU Commission is proceeding.</p>				
<b>Score: 80</b>				
<b>Audit Trace References</b>				
Dinmore et al. 2003, Jak et al. 2009, JNCC 2009				

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
2.4.3	<b>Information monitoring</b> Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types.	<p>There is a basic understanding of the types and distribution of main habitats in the area of the fishery.</p> <p>Information is adequate to broadly understand the nature of the main impacts of gear use on the main habitats, including spatial overlap of habitat with fishing gear</p>	<p>The nature, distribution and vulnerability of all main habitat types in the fishery area are known at a level of detail relevant to the scale and intensity of the fishery.</p> <p>Sufficient data are available to allow the nature of the impacts of the fishery on habitat types to be identified and there is reliable information on the spatial extent of interaction, and the timing and location of use of the fishing gear.</p> <p>Sufficient data continue to be collected to detect any increase in risk to habitat (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).</p>	<p>The distribution of habitat types is known over their range, with particular attention to the occurrence of vulnerable habitat types.</p> <p>Changes in habitat distributions over time are measured.</p> <p>The physical impacts of the gear on the habitat types have been quantified fully.</p>

Scoring Comments
<p>The North Sea ecosystem is one of the most studied shelf sea ecosystems worldwide with a range of national and international research programs. The North Sea has been subject of a number of research programs relevant to habitat mapping e.g. UK NERC North Sea program. Plankton is monitored on a monthly basis (Continuous Plankton Recorder program; <a href="http://www.sahof.ac.uk">www.sahof.ac.uk</a>) and less frequent observations made of nutrients and contaminants, fish distribution and abundance (ICES International Bottom Trawl Surveys). Additional monitoring of phytoplankton, zooplankton, Harmful Algal Blooms and benthic communities takes place in coastal waters by national institutes under the EU Water Framework Directive and includes some ferry-box routes (commercial ferries equipped with automated sampling equipment). Around the coast there are a number of long-running time-series monitoring various parameters including water temperature, salinity, phytoplankton and zooplankton. These include the Helgoland Roads station (Germany), Dove station (off NE coast of UK) and Stonehaven (off Scottish east coast). General bathymetric data are available covering the whole North Sea in vector format as Digibath250 products from the British Geological Survey. Fishing vessels can contribute to improved bathymetry by submitting data to the OLEX system (<a href="http://www.oceandtm.com">www.oceandtm.com</a>). Broad-scale mapping of North Sea seabed sediments goes back at least 200 years and the distribution of basic sediment types is well known. Such information is available from standard hydrographic charts and scientific publications. Compiled seabed sediment data for the North Sea are available as vector format DigSBS250 from British Geological Survey under licence. Detailed sidescan sonar mapping of parts of the North Sea have been conducted particularly in relation to oil and gas exploration and dredging operations but these data are not widely available. The general distribution of benthic organisms in the North Sea is known from comprehensive surveys conducted in the 1980s and 1990s. However these data are not updated regularly. Although benthic communities are often thought of as being relatively stable, the abundance of larval stages of different groups of benthic organisms in the North Sea CPR data have shown some dramatic and quite rapid changes during the latter part of the 20<sup>th</sup> century.</p>

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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The need for more comprehensive mapping was recognised by the 5<sup>th</sup> North Sea Ministerial Declaration (2002) and the ministers specifically encouraged OSPAR and the European Environment Agency (EEA) to start marine habitat mapping of the North Sea by 2003 (as required for OSPAR's Biodiversity Committee's, programme to map the distribution of 14 priority habitats across the OSPAR north-east Atlantic region). Information on the geographic distribution of particularly vulnerable habitats was gathered via many national programs but co-ordination is still problematic. Mapping sensitive habitats in the North Sea is co-ordinated through OSPAR's Marine protected Areas Species and Habitats. At a European level, the project MESH (2004-2008) aims to provide a unified portal to access such data ([www.searchmesh.net/](http://www.searchmesh.net/)). Despite these efforts, a single point-source for collated, quality controlled habitat seabed data covering the whole North Sea is still not readily available. In particular data to the north-west of the UK sector, which is one of the fished areas in this assessment, are not included in MESH.

During the audit, the team were presented with some VMS track data showing where the UoC fish. The main areas fished are on sand and muddy-sand habitats. As explained earlier these habitats are subject to natural disturbance and should be less sensitive than muddy habitats. The fished areas do however overlap the proposed Dogger Bank SAC but this will be taken into account as the Dutch government develops the Natura2000 management plan for this area.

The nature, distribution and vulnerability of all main habitat types in the fishery area are known at a level of detail relevant to the scale and intensity of the fishery – this is generally true although habitat data coverage varies throughout ICES Division IVb. More detailed mapping has been conducted in the proposed SACs.

Sufficient data are available to allow the nature of the impacts of the fishery on habitat types to be identified and there is reliable information on the spatial extent of interaction, and the timing and location of use of the fishing gear – generally this is true but overlay mapping of the VMS fishing tracks with habitat maps is needed to identify any interactions with especially sensitive habitats.

We have scored habitat impacts on the basis that the fishery only operates on sandy or muddy-sand grounds and that these are less sensitive to disturbance compared to muddy grounds. However, a condition has been raised under 2.3.3 so that the fishing locations can be checked in relation to habitats.

**Score: 80**

#### **Audit Trace References**

[www.searchmesh.net/](http://www.searchmesh.net/)

Eisma, 1981, Jak (2009), JNCC (2009), Kirby et al. 2008, Kirby & Beaugrand 2008

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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2.5	Ecosystem
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2.5.1	<p><b>Status</b> The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function.</p>	<p>The fishery is <u>unlikely</u> to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.</p>	<p>The fishery is <u>highly unlikely</u> to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.</p>	<p>There is <u>evidence</u> that the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.</p>
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<p><b>Scoring Comments</b></p> <p>There is some evidence that trawling can alter the biogeochemical functioning of sediments. However this relates mainly to disturbance to muddy sediments e.g. in the Silver Pit which is less naturally disturbed (Trimmer et al. 2005). As well as physical disturbance, changes to the infaunal community will affect rates of draw down and mixing of interstitial water into the sediment and thus biogeochemical processes. Using the ERSEM model, Allen and Clark (2007) suggested that sediments in most areas of the North Sea would recover full biogeochemical functioning after 5 yrs following exclusion of trawling although this was dependent upon assumptions about the recovery rates of infaunal communities.</p> <p>The UoC is relatively small-scale and fishes on sand and muddy-sand bottom types. Due to relative scale and location of the fishery and the status of the wider North Sea ecosystem, the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.</p>
<p><b>Score: 90</b></p>
<p><b>Audit Trace References</b></p> <p>Riemann &amp; Hoffman, 1991, Duplisea, et al. 2001, Trimmer et al. 2005, Allen &amp; Clark, 2007</p>

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
2.5.2	<p><b>Management strategy</b></p> <p>There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function.</p>	<p>There are <u>measures</u> in place, if necessary, that take into account potential impacts of the fishery on key elements of the ecosystem.</p> <p>The measures are considered likely to work, based on <u>plausible argument</u> (eg, general experience, theory or comparison with similar fisheries/ ecosystems).</p>	<p>There is a <u>partial strategy</u> in place, if necessary, that takes into account available information and is expected to restrain impacts of the fishery on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance.</p> <p>The partial strategy is considered likely to work, based on <u>plausible argument</u> (eg, general experience, theory or comparison with similar fisheries/ ecosystems).</p> <p>There is <u>some evidence</u> that the measures comprising the partial strategy are being implemented successfully.</p>	<p>There is a <u>strategy</u> that consists of a <u>plan</u>, containing measures to address all main impacts of the fishery on the ecosystem, and at least some of these measures are in place. The plan and measures are based on well-understood functional relationships between the fishery and the Components and elements of the ecosystem.</p> <p>This plan provides for development of a full strategy that restrains impacts on the ecosystem to ensure the fishery does not cause serious or irreversible harm.</p> <p>The measures are considered likely to work based on <u>prior experience</u>, plausible argument or <u>information</u> directly from the fishery/ecosystems involved.</p> <p>There is <u>evidence</u> that the measures are being implemented successfully.</p>

### Scoring Comments

At a high level the EU has adopted an Ecosystem Approach to fisheries management as part of the Marine Strategy (European Commission 2006). This along with relevant nature conservation directives means that the competent authorities must ensure good ecological status of the North Sea by a target date of 2012. This strategy is in development and is not yet at the stage of a plan, containing measures to address all main impacts of the fishery on the ecosystem. Part of the approach will be the development of the Natura2000 network but another aspect will be that ecosystem considerations must be taken more into account in the reformed Common Fisheries Policy. Under an EAF, the wider ecosystem impacts of fisheries will need to be taken into account. Implementation of a full EAF is still some way off and considerable scientific debate is taking place as to the best ways to implement such a policy (Garcia & Cochrane, 2005, Plagányi, 2007). In the meantime a number of measures are in place to identify and avoid or reduce ecosystem impacts. This has resulted in additional controls on certain fishing activities thought to be especially damaging e.g. trawling within deep-water habitats such as the Darwin Mounds.

The EU has funded a number of projects to examine improved gear design for reducing ecosystem impacts including RECOVERY and REDUCE but the extent to which technical measures are acceptable to the industry depends on a wide range of factors (Park et al. 2008). In contrast, the unit of certification reported that they catch relatively little benthos. This view was supported by the Netherlands Fisheries Inspectorate in oral evidence.



1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
<p>There is therefore a partial strategy in place (EU Habitats Directive and the development of the Natura2000 network, the Marine Strategy and the Reform of the CFP) that takes into account available information and is expected to restrain impacts of the fishery on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance.</p> <p>The partial strategy is considered likely to work, based on plausible argument (eg, general experience, theory or comparison with similar fisheries/ ecosystems).</p> <p>There is some evidence that the measures comprising the partial strategy are being implemented successfully. The process of setting up conservation areas in the offshore parts of the North Sea is at the nomination and designation stages. Reforms to the CFP will most likely place greater emphasis on the ecological status of the North Sea in relation to fisheries.</p>				
<b>Score: 85</b>				
<b>Audit Trace References</b>				
European Commission, 2009				

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
2.5.3	<p><b>Information monitoring</b></p> <p>There is adequate knowledge of the impacts of the fishery on the ecosystem.</p>	<p>Information is adequate to <u>identify</u> the key elements of the ecosystem (e.g. trophic structure and function, community composition, productivity pattern and biodiversity).</p> <p>Main impacts of the fishery on these key ecosystem elements can be inferred from existing information, but <u>have not been investigated in detail</u>.</p>	<p>Information is adequate to <u>broadly understand</u> the key elements of the ecosystem.</p> <p>Main impacts of the fishery on these key ecosystem elements can be inferred from existing information, but <u>may not have been investigated in detail</u>.</p> <p>The main functions of the Components (i.e. target, By-catch, Retained and ETP species and Habitats) in the ecosystem are <u>known</u>.</p> <p>Sufficient information is available on the impacts of the fishery on these Components to allow some of the main consequences for the ecosystem to be inferred.</p> <p>Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).</p>	<p>Information is adequate to <u>broadly understand</u> the key elements of the ecosystem.</p> <p>Main <u>interactions</u> between the fishery and these ecosystem elements can be inferred from existing information, and <u>have been investigated</u>.</p> <p>The impacts of the fishery on target, By-catch, Retained and ETP species and Habitats are identified and the main functions of these Components in the ecosystem are <u>understood</u>.</p> <p>Sufficient information is available on the impacts of the fishery on the Components <u>and elements</u> to allow the main consequences for the ecosystem to be inferred.</p> <p>Information is sufficient to support the development of strategies to manage ecosystem impacts.</p>

Scoring Comments
Information is adequate to broadly understand the key elements of the ecosystem – the North Sea is one of the best studied shelf seas in the world and there is good understanding of the key elements of the ecosystem including monitoring of most components and modelling of ecosystem structure and functioning including oceanography, biogeochemistry, and foodwebs. However, the North Sea is also one of the most heavily used seas with a wide range of impacting activities including fisheries, transport, offshore energy and aggregate extraction. Because of these

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
	<p>multiple factors, in addition to climate change and nutrient run-off, it has often been difficult to determine the underlying cause for some of the observed changes e.g. in benthos. The main impacts of the UoC fishery on these key ecosystem elements can therefore be inferred from existing information but have not been investigated in detail.</p> <p>More research on interactions between fishery and ecosystem components would be useful. This is especially important as the dominant gear types used in the North Sea are likely to continue to change in the near future in response to fuel prices and nature conservation issues. Research into the impacts of beam trawling developed strongly in the 1980s and 1990s but scientific consensus on the impacts was probably only reached after at least a decade of research. Since twin-rig trawling for flatfish has developed relatively recently, this explains why there is a relative lack of scientific data on the impacts. The main impacts of the fishery on key ecosystem elements can be inferred from existing information, but may not have been investigated in detail.</p> <p>Once beyond the juvenile stage, plaice are not major predators, or major prey of other fish e.g. plaice comprise only around 0.2% of stomach contents of cod (DAPSTOM database, Cefas). Plaice have been included in ECOPATH models representing how the North Sea foodweb appeared in the 1980s (Christensen 1995) and reconstructing the possible foodweb before heavy fishing (Mackinson 2001). The North Sea ECOPATH model has recently been upgraded to include spatial representation (Mackinson &amp; Daskalov 2007). The ICES Working Group on Multispecies Assessment Methods have recently begun work on comparing results from North Sea EwE models with MSVPA. However, because of the low inter-action of plaice with other fish species, this is unlikely to lead to substantial revisions in the perception of energy flows to or from this species. Plaice were also included as a key component in the demersal benthivore guild in the food web analyses of Greenstreet et al. (1997) and Heath (2005). The main fish species (dab and cod) and minor fish species retained by the UoC are also included in these models. The impacts of the fishery on target, By-catch, Retained and ETP species and Habitats are identified and the main functions of these Components in the ecosystem are understood.</p> <p>Sufficient information is available on the impacts of the fishery on these Components and elements to allow some of the main consequences for the ecosystem to be inferred. The effects of changes in temperature on some elements of the ecosystem are known e.g. cold winters are associated with stronger than average recruitment for cod and plaice (Fox et al. 2000, O'Brien et al. 2000). Several studies have examined how changing temperatures affect the distribution of fish in the North Sea (Perry et al. 2005). At the wider ecosystem level considerable research has been undertaken on the changes in North Sea plankton (Kirby et al. 2008). Ecosystem level changes are implicitly taken into account in the management of the main commercial stocks through the impacts on recruitment and growth. However, environmental change is not normally explicitly incorporated into the forward projections produced by the working groups as it requires very strong assumptions about how the ecosystem and individual stocks will respond. For example, although Clark et al. (2003) demonstrated that climate change would eventually impact North Sea cod, in the short to medium term the probability of recovery was more strongly affected by fishing pressure. In the long-term the stock could be managed more robustly by using reference points based on F, rather than biomass (Kell et al. 2005). In theory, managing to F based target points should track changes in stock productivity better than managing to fixed biomass targets. Although this type of analysis has not been performed for all species where a link between the environment and recruitment or growth is suspected, similar conclusions would probably hold.</p> <p>Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures). The amount of data available on the impacts of twin-rig trawling on the ecosystem is likely to increase in the coming decade as there is a shift from beam trawling to twin-rigging in the North Sea and research effort responds to this. The UoC will make available to researchers such data as may assist this research e.g. VMS data on areas fished.</p>			
	<b>Score: 90</b>			
	<b>Audit Trace References</b>			
	Christensen, 1995, Clark et al. 3002, Fox et al. 2000, Greenstreet et al. 1997, Heath 2005, Kell et al. 2005, Kirby et al. 2008, Mackinson & Dakalov, 2007, O'Brien et al. 2000, Perry et al. 2005			

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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Principle 3	The fishery is subject to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable			
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3.1	Governance and Policy			
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3.1.1	<p><b>Legal and/or customary framework</b></p> <p>The management system exists within an appropriate and effective legal and/or customary framework which ensures that it:</p> <ul style="list-style-type: none"> <li>- Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2;</li> <li>- Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and</li> <li>- Incorporates an appropriate dispute resolution framework.</li> </ul>	<p>The management system is generally consistent with local, national or international laws or standards that are aimed at achieving sustainable fisheries in accordance with MSC Principles 1 and 2.</p> <p>The management system incorporates or is subject by law to a <u>mechanism</u> for the resolution of legal disputes arising within the system.</p> <p>Although the management authority or fishery may be subject to continuing court challenges, it is not indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability for the fishery.</p> <p>The management system has a mechanism to <u>generally respect</u> the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.</p>	<p>The management system is generally consistent with local, national or international laws or standards that are aimed at achieving sustainable fisheries in accordance with MSC Principles 1 and 2.</p> <p>The management system incorporates or is subject by law to a <u>transparent mechanism</u> for the resolution of legal disputes which is <u>considered to be effective</u> in dealing with most issues and that is appropriate to the context of the fishery.</p> <p>The management system or fishery is attempting to comply in a timely fashion with binding judicial decisions arising from any legal challenges.</p> <p>The management system has a mechanism to <u>observe</u> the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.</p>	<p>The management system is generally consistent with local, national or international laws or standards that are aimed at achieving sustainable fisheries in accordance with MSC Principles 1 and 2.</p> <p>The management system incorporates or is subject by law to a <u>transparent mechanism</u> for the resolution of legal disputes that is appropriate to the context of the fishery and has been <u>tested and proven to be effective</u>.</p> <p>The management system or fishery acts proactively to avoid legal disputes or rapidly implements binding judicial decisions arising from legal challenges.</p> <p>The management system has a mechanism to <u>formally commit</u> to the legal rights created explicitly or established by custom on people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.</p>
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<b>Scoring Comments</b>				
Fisheries are managed through the Common Fisheries Policy of the EU in accordance with the basic fisheries regulation (EC. 2371/2002). Article 2.2 of this regulation states, "The Common Fisheries Policy shall be guided by the following principles of good governance:				

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
	<p>(a) clear definition of responsibilities at the Community, national and local levels;</p> <p>(b) a decision-making process based on sound scientific advice which delivers timely results;</p> <p>(c) broad involvement of stakeholders at all stages of the policy from conception to implementation;</p> <p>(d) consistence with other Community policies, in particular with environmental, social, regional, development, health and consumer protection policies.</p> <p>A multiannual plan has also been in place since 2008 for plaice and sole in the North Sea (EC 676/2007). Decisions under this plan continue to be made by the Council following recommendations by the Commission, as with other current fisheries management under the CFP.</p> <p>The management system is in accordance with EU regulations and national legislation of EU member states involved (UK, DK, NL).</p>			
	<b>Score: 90</b>			
	<p>The management system is demonstrably compliant with all relevant national legislation.</p> <p>Rights are set out in EC and Nation State law. There are no customary rights of people dependent upon fishing. Those that wish to fish can do so within the constraints of the fishery management measures.</p> <p>The system observes all legal and customary rights of people dependent upon fishing under a formal codified system.</p> <p>Ultimately, any European citizen or organisation can take legal action against the Council of Ministers in the European Court of Justice.</p> <p>There is an appropriate and tested mechanism within the system for the documentation and resolution of disputes of varying magnitude. However dispute resolution at lower levels appears to be on an ad hoc basis that cannot be traced.</p>			
	<b>Audit Trace References</b>			
	<p>Council Regulation (EC) No. 676/2007 - establishing a multiannual plan for fisheries exploiting stocks of plaice and sole in the North Sea</p> <p>Council Regulation (EC) No. 2371/2002 - on the conservation and sustainable exploitation of fisheries resources under the Common Fisheries Policy</p>			

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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3.1.2	<p><b>Consultation, roles and responsibilities</b> The management system has effective consultation processes that are open to interested and affected parties.</p> <p>The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties.</p>	<p>Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are <u>generally understood</u>.</p> <p>The management system includes consultation processes that <u>obtain relevant information</u> from the main affected parties, including local knowledge, to inform the management system.</p>	<p>Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are <u>explicitly defined and well understood for key areas</u> of responsibility and interaction.</p> <p>The management system includes consultation processes that <u>regularly seek and accept</u> relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.</p> <p>The consultation process <u>provides opportunity</u> for all interested and affected parties to be involved.</p>	<p>Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are <u>explicitly defined and well understood for all areas</u> of responsibility and interaction.</p> <p>The management system includes consultation processes that <u>regularly seek and accept</u> relevant information, including local knowledge. The management system demonstrates consideration of the information and <u>explains</u> how it is used or not used.</p> <p>The consultation process <u>provides opportunity and encouragement</u> for all interested and affected parties to be involved, and <u>facilitates</u> their effective engagement.</p>
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Scoring Comments
<p>Implementation of the CFP (and implementation of Habitats Directive etc) at a national level is carried out through the individual Member States. Member States Fisheries enforcement authorities (Inspectorates: MFA – England; Marine Scotland Compliance -Scotland, Algemene Inspectie Dienst (AID)) co-operate in policing the fishery (e.g. satellite monitoring, landing recording etc). The Commission can also request fishery related data from member states.</p> <p>Stakeholders affected by the CFP participate in the CFP process through their national agencies and through Regional Advisory Councils (RACs). RACs prepare recommendations and suggestions on fisheries aspects in the area they cover and transmit them to the Commission or to the relevant national authorities. The RACs are made up of representatives of the fisheries sector and NGO's. How these recommendations are addressed by the Commission is not fully transparent.</p> <p>The main Fisheries Organisations involved with this fishery is the North Sea Fisheries Organisation (NSFO). The NFSO is mainly involved with quota management but may also implement/issue other management measures.</p> <p>Scientific research and assessment is carried out by ICES. Advice is provided through the Advisory Committee on Fisheries Management (ACOM) on the status of target and non-target stocks to the European Commission. ICES advice, via Commission proposals, informs the annual EU Council of Ministers regulation establishing management measures, in particular TAC's and quotas. TAC's and quotas for this fishery are set in this regulation for EC member states. ICES has sought greater involvement of fishermen in the stock assessment process. This is also true of Imares at the specific fishery level. It is not clear how and why such information is considered and adopted or dismissed by scientists.</p>
<b>Score: 90</b>

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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Organisations with management responsibility are clearly defined including all areas of responsibility; however interactions between some organisations are not clear. The system does provide the opportunity for stakeholder involvement, e.g. through the North Sea RAC. There is evidence that managers and scientists regularly seek and accept relevant information including local knowledge (e.g. Aarts & van Helmond, 2007), but the system does not always explain how it is used or why it is not used in a fully transparent manner.				
<b>Audit Trace References</b>				
(Aarts & van Helmond, 2007) Discard sampling of Plaice ( <i>Pleuronectes platessa</i> ) and Cod ( <i>Gadus morhua</i> ) in the North Sea by the Dutch demersal fleet from 2004 to 2006 Dr. Dr. Ir. G. M. Aarts & Ir. A.T.M. van Helmond. Imares Report number C120/07				

1 SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
3.1.3	<b>Long term objectives</b> The management policy has clear long-term objectives to guide decision-making that are consistent with MSC Principles and Criteria, and incorporates the precautionary approach.	Long-term objectives to guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are <u>implicit</u> within management policy.	<u>Clear</u> long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are <u>explicit</u> within <u>and required by</u> management policy.
<b>Scoring Comments</b>			
<p>The EU's Marine Strategy Framework Directive (MSFD) develops a regional seas approach (which includes the North Sea) to managing the marine environment. The key long term objective is ensuring good environmental status by 2020. Overall marine environmental status is to be determined through the status of a number of qualitative descriptors, including "Populations of all commercially exploited fish and shellfish are within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock." The types of measures proposed to achieve this include input controls, output controls and spatial &amp; temporal restrictions on economic activities.</p> <p>The reform of the CFP in 2002 included developing a longer term approach to fisheries management. Since then Long Term Management Plans have been introduced for key stocks, including for North Sea plaice in a joint plan with sole.</p> <p>This longer-term approach to stock management is required to deliver wider long-term objectives such as that made by the European Member States at the 2002 Johannesburg World Summit on Sustainable Development to bring all European fish stocks to a state where they can produce at Maximum Sustainable Yield (MSY) by 2015.</p> <p>The multiannual plan (EC Reg 676/2007) states: "The objective of the plan is to ensure, in a first stage, that stocks of plaice and sole in the North Sea are brought within safe biological limits, and in a second stage and after due consideration by the Council on the implementing methods for doing so that those stocks, are exploited on the basis of maximum sustainable yield and under sustainable economic, environmental and social conditions."</p> <p>The plan is now in the management phase for plaice, however due to uncertainties ICES concluded that it "cannot presently conclude on the precautionary nature of the management plan for plaice."</p>			
<b>Score: 85</b>			
<p>Higher level framework has explicit objectives adopting a precautionary approach.</p> <p>The multiannual plan has explicit long term objectives and is now in the management phase for plaice, however due to some uncertainties ICES concluded that it "cannot presently conclude on the precautionary nature of the management plan for plaice." This suggests that while the need for the precautionary approach is explicit within management policy, it has not strictly been required by management policy.</p>			
<b>Audit Trace References</b>			
Council Regulation (EC) No. 676/2007 - establishing a multiannual plan for fisheries exploiting stocks of plaice and sole in the North Sea			



1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
3.1.4	<b>Incentives for sustainable fishing</b> The management system provides economic and social incentives for sustainable fishing and does not operate with subsidies that contribute to unsustainable fishing.	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2.	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and seeks to ensure that perverse incentives do not arise.	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and <u>explicitly considers</u> incentives in a <u>regular review</u> of management policy or procedures to ensure that they do not contribute to unsustainable fishing practices.

Scoring Comments
<p>At an EU level, the 2002 maintenance of relative stability and the 2007 introduction of the multi-annual plan have provided stability and security for fishers. The Council control regulation (13669/09) seeks a more consistent system of ‘command and control’ across EU waters that attempt to deliver CFP objectives, ie. a sustainable outcome.</p> <p>The days at sea arrangements are, however highly complex and in certain aspects affecting this UoC do in fact result in the ‘perverse incentive’ to operate with a net of smaller mesh size than they wish to operate with. While the resulting level of discarding may not be unsustainable, it is not consistent with MSC Principle 2 as it is highly likely to result in more by-catch than with a larger mesh size.</p> <p>At the national level, the allocation of fixed quota allocations per vessel has defined fishing rights to enable longer term planning, which is consistent with better ensuring sustainable outcomes. These rights, however, stop short of being Individual Transferable Rights (ITRs) as ownership of those rights resides with the UK state rather than with individuals. The licence and FQAs give individuals permission to fish on behalf of the state each year.</p> <p>Member states have developed various incentives to encourage more sustainable fishing, which are full observed by the UoC. For example, England operates real time closures (RTC), Scotland has a conservation credits scheme (CCS) for cod and the Netherlands have developed RTCs for plaice.</p> <p>The UoC have adopted several measures that can be considered precautionary; closed season that also inherently avoids spawning aggregations, light ticklers, no weekend fishing, etc. (see section 6.8).</p>
Score: 75
Many aspects of the CFP and national management aim for sustainable behaviour. However a system of ‘command and control dominates, rather than one of incentivising fishers to operate responsibly. A ‘perverse incentive’ has arisen in measures under the cod recovery plan whereby days at sea are allocated to particular gears.
Audit Trace References
<p>Council Regulation 13669/09 establishing a Community control system for ensuring compliance with the rules of the Common Fisheries Policy.</p> <p>Council Regulation 1415/2004 establishes the management of effort in demersal fisheries such as plaice via days at sea. The UoC vessels are also subject to days at sea restrictions under Council Regulation 1342/2008 on the Long term plan for cod stocks.</p>

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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3.2	Fishery- specific management system			
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3.2.1	<b>Fishery-specific objectives</b> The fishery has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2.	Objectives, which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are <u>implicit</u> within the fishery's management system.	<u>Short and long term objectives</u> , which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are <u>explicit</u> within the fishery's management system.	<u>Well defined and measurable short and long term objectives</u> , which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are <u>explicit</u> within the fishery's management system.
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#### Scoring Comments

Both short and long term objectives are defined in the multiannual management plan (676/2007).

These are explicit in relation to the target fishery in terms of biomass and fishing mortality:

The Scientific, Technical and Economic Committee for Fisheries (STECF) has advised that the precautionary biomass for the stock of plaice in the North Sea should be 230 000 tonnes, that the fishing mortality rate necessary to produce the highest yield from the stock of plaice in the North Sea in the long term is 0,3 and that the precautionary biomass for the stock of sole in the North Sea should be 35 000 tonnes.

Broader objectives are also explicit:

The objective of the plan is to ensure, in a first stage, that stocks of plaice and sole in the North Sea are brought within safe biological limits, and in a second stage and after due consideration by the Council on the implementing methods for doing so that those stocks, are exploited on the basis of maximum sustainable yield and under sustainable economic, environmental and social conditions.

#### Score: 80

Short and long term objectives are explicit within the multiannual management plan and these are measurable in relation to MSC principle 1 aspects (biomass and fishing mortality). However, other objectives such as those relating to MSC principle 2 on ecosystem and habitat impacts are not well defined and measurable)

#### Audit Trace References

Council Regulation (EC) No. 676/2007 - establishing a multiannual plan for fisheries exploiting stocks of plaice and sole in the North Sea

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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3.2.2	<b>Decision-making processes</b> The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives.	There are <u>informal</u> decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.  Decision-making processes respond to <u>serious issues</u> identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take <u>some</u> account of the wider implications of decisions.	There are <u>established</u> decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.  Decision-making processes respond to <u>serious and other important issues</u> identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.  Decision-making processes use the precautionary approach and are based on best available information.  <u>Explanations</u> are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.	There are <u>established</u> decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.  Decision-making processes respond to <u>all issues</u> identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.  Decision-making processes use the precautionary approach and are based on best available information.  <u>Formal reporting</u> to all interested stakeholders describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.
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Scoring Comments
<p>Decision-making is intended to be evidence-based using ICES assessment information as a basis. Information gathering, and dissemination of results, takes place between ICES Working Group members and industry stakeholders.</p> <p>The multiannual management plan (EC 676/2007) establishes decision-making procedures that respond to serious and other important issues. Decision making is informed by stock assessment advice that is based on the precautionary approach.</p> <p>With actions under the management plan deferred to the two-year review and ultimately based on a council decision, decision-making may not currently be viewed as being carried out in a timely or a transparent manner. This should, however, be balanced with the benefit of stability resulting from a clearly defined management plan and review period. Article 18 of the plan does also make provision for interventions under special circumstances “In the event that STECF advises that the spawning stock size of either or both plaice or of sole is suffering reduced reproductive capacity, the Council shall decide by qualified majority on the basis of a proposal from the Commission on a TAC for plaice that is lower than that provided for in Article 7, on a TAC for sole that is lower than that provided for in Article 8, and on levels of fishing effort that are lower than those provided for in Article 9.2.”</p> <p>The above indicates that the plan allows for adaptive decision-making in a timely manner. Experience in the North Sea cod fishery indicates that the EC is prepared to adapt plans if required. As Council Regulation No 1342/2008 states in relation to the cod recovery plan implemented under Council Reg. 423/2004: “It appears necessary to reinforce the regime and to introduce a long-term plan in order to achieve sustainable exploitation of cod stocks on the basis of maximum sustainable yield.”</p>

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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<b>Score: 80</b>				
Consultation processes exist between the fishing industry and National authorities and often between National fishing associations, NGO's etc and the Commission. The latter takes the views of the industry through DG Mare Advisory Committee on Fisheries and discusses issues with the Member States and the Council, particularly through the Regional Advisory Council (RAC). The system includes an appropriate decision-making process including all main public and private stakeholders				
<b>Audit Trace References</b>				
Council Regulation (EC) No. 676/2007 - establishing a multiannual plan for fisheries exploiting stocks of plaice and sole in the North Sea				

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
3.2.3	<b>Compliance and enforcement</b> Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with.	Monitoring, control and surveillance <u>mechanisms</u> exist, are implemented in the fishery under assessment and there is a reasonable expectation that they are effective.  Sanctions to deal with non-compliance exist and there is some evidence that they are applied.  Fishers are <u>generally thought</u> to comply with the management system for the fishery under assessment, including, when required, providing information of importance to the effective management of the fishery.	A monitoring, control and surveillance <u>system</u> has been implemented in the fishery under assessment and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.  Sanctions to deal with non-compliance exist, <u>are consistently applied</u> and thought to provide effective deterrence.  <u>Some evidence exists</u> to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.  There is no evidence of systematic non-compliance.	A <u>comprehensive</u> monitoring, control and surveillance system has been implemented in the fishery under assessment and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.  Sanctions to deal with non-compliance exist, are consistently applied and <u>demonstrably</u> provide effective deterrence.  There is a <u>high degree of confidence</u> that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery.  There is no evidence of systematic non-compliance.

<b>Scoring Comments</b> The Netherlands and the UK enforcement agencies have implemented and improved systems that have demonstrably improved compliance with the management system. This includes sanctions that can act as a deterrent to non-compliance, but these are not consistently applied across all member states (EU Court of Auditors, 2007). There is no evidence of systematic non-compliance and the fishers themselves now contribute to management through provision of information for real time closures (RTC).
<b>Score: 90</b> All parties have reported relatively high levels of compliance in the fishery. The weaknesses identified by the Court of Auditors indicates that there is inconsistency in the application of sanctions and some weaknesses remain in VMS systems that introduce uncertainty over levels of compliance.
<b>Audit Trace References</b> (EU Court of Auditors, 2007) COURT OF AUDITORS SPECIAL REPORT No 7/2007 on the control, inspection and sanction systems relating to the rules on conservation of Community fisheries resources ( <i>pursuant to Article 248(4) second paragraph, EC</i> ) (2007/C 317/01)

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
3.2.4	<b>Research plan</b> The fishery has a research plan that addresses the information needs of management.	<u>Research</u> is undertaken, as required, to achieve the objectives consistent with MSC's Principles 1 and 2.  Research results are <u>available</u> to interested parties.	A <u>research plan</u> provides the management system with a strategic approach to research and <u>reliable and timely information</u> sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.  Research results are <u>disseminated</u> to all interested parties in a <u>timely</u> fashion.	A <u>comprehensive research plan</u> provides the management system with a coherent and strategic approach to research across P1, P2 and P3, and <u>reliable and timely information</u> sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.  Research <u>plan</u> and results are <u>disseminated</u> to all interested parties in a <u>timely</u> fashion and are <u>widely and publicly available</u> .

Scoring Comments
<p>ICES is the main scientific body that co-ordinates research in the fishery. Regular planned research is undertaken to inform stock assessment by a variety of research institutes such as Imares, Cefas and Marine Scotland Science. Each develops a research plan to ensure adequate information is provided to ICES in a timely manner. ICES, a Methods Working Group keeps methods for fish stock assessment under regular review. Study groups exist to review, for example, Revision of Data, Precautionary Approach Preliminary Limits and Discards and Biological Sampling. Benchmark assessments are completed annually on the plaice fishery (see ICES, 2009).</p> <p>ICES has developed a strategic plan which includes a science plan, an advisory plan and a secretariat plan. The new ICES science plan has recently been developed for 2009-2013. The two main goals of the plan are to:</p> <ol style="list-style-type: none"> <li>Plan and implement a programme of science in partnership with member countries to deliver the needs to customers and stakeholders.</li> <li>Establish effective mechanisms of collaboration within ICES and with others (organisations etc.) to deliver and add value to ICES science and advisory programmes.</li> </ol> <p>Additional ad hoc research is undertaken by ICES at the request of the Commission and by national institutes at the request of their own management agencies. Results from ICES stock assessments and other Working Group documents are freely available on the internet.</p>
Score: 85
A comprehensive body of research exists and continues to be developed in a co-ordinated manner by ICES and member state institutes. However there is no evidence of a strategic approach to research across all aspects, for example the development of a strategic research plan by ICES to directly support the multiannual management plan.
Audit Trace References
(ICES, 2009) Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, 6-12 May 2009 (ICES CM 2009/ACFM:10). ICES, A vision worth sharing. ICES Strategic Plan, 2008

1	SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
3.2.5	<p><b>Monitoring and management performance evaluation</b></p> <p>There is a system for monitoring and evaluating the performance of the fishery-specific management system against its objectives.</p> <p>There is effective and timely review of the fishery-specific management system.</p>	The fishery has in place mechanisms to evaluate <u>some</u> parts of the management system and is subject to <u>occasional internal</u> review.	The fishery has in place mechanisms to evaluate <u>key</u> parts of the management system and is subject to <u>regular internal</u> and <u>occasional external</u> review.	The fishery has in place mechanisms to evaluate <u>all</u> parts of the management system and is subject to <u>regular internal</u> and <u>external</u> review.

#### Scoring Comments

The CFP is subject to a review every 10 years, the last being in 2002 and next is in 2012. The Commission Green Paper on CFP Reform (EC, 2009) presented a comprehensive review of the current CFP and has been the basis of extensive discussions with stakeholders are ongoing in relation to this next reform of the CFP.

The multiannual plan is subject to biannual review: “The Commission shall, on the basis of advice from STECF, evaluate the impact of the management measures on the stocks concerned and the fisheries on those stocks, in the second year of application of this Regulation and in each of the following years.”

Quota management by the PO is effectively on a daily basis, with fishery management review on a real time basis as fishing patterns are adjusted to available fishing opportunities (e.g. remaining quota and days at sea).

#### Score: 95

Regular internal and occasional external review does occur, as described above. All parts of the management system are reviewed regularly, but at varying time intervals (stock assessment 1 year, management plan 2 years, CFP 10 years) with some external review is on an ad hoc basis (e.g. EU Court of Auditors, 2007)

#### Audit Trace References

(EC, 2009) Com 2009/163 (final) Green paper Reform of the Common Fisheries Policy

(EU Court of Auditors, 2007) COURT OF AUDITORS SPECIAL REPORT No 7/2007 on the control, inspection and sanction systems relating to the rules on conservation of Community fisheries resources (*pursuant to Article 248(4) second paragraph, EC*) (2007/C 317/01)

Council Regulation (EC) No. 676/2007 - establishing a multiannual plan for fisheries exploiting stocks of plaice and sole in the North Sea

## 16 APPENDIX B

### Peer Review Reports

Reference	Peer reviewers comments	MML and Assessment Team response
1.1	<b>1.1 The fishery proposed for certification, Geographical area:</b> a chart ( <b>Fig. 10?</b> ) showing the geography of the North Sea, the areas fished by the UoC and place names used in the text would be very useful to those without such local knowledge. Note throughout the report that Division (not Area) IVb is the central North Sea, and does not include the southern North Sea (IVc).	Chart inserted showing division IVb. Text amended to 'Division' from 'area'
1.1	It would also be useful here to confirm that the UoC presently comprises 4 vessels, and to explain that they operate with different cod-end mesh sizes depending on the location fished; 95-100 mm in the designated flatfish area (south of 55°/56°N) in order to qualify for additional days at sea, and 110 – 130 mm to the north of this. It is not obvious that designating these metiers UoC1 and UoC2 is particularly helpful, since any or all of the four vessels could occupy them at a particular time.	Following text added: To comply with effort management measures under the cod recovery plan vessels in the UoC operate different cod-end mesh sizes depending on the location fished; 95-100 mm in the designated flatfish area (south of 55°/56°N), and 110 – 130 mm to the north of this. Therefore two UoC are considered:
	<b>By-catch and discarding:</b> you state that, “under the current Netherlands self-sampling scheme, fishers return the complete catch (minus the target species) from one or two hauls per trip to IMARES where the by-catch is sorted, identified and measured”. Do you mean the target species (which include undersized plaice, for example), or the retained species (which may include non-target but valuable by catch species)?	No additional This should have read ‘retained species’. Modified in the text
4.3.3	Gives <i>landings</i> of plaice and other key species, but no discard data on other commercial species. 2% of <i>landings</i> was cod. What about percent of <i>catch</i> ? It is the catch that characterizes the ecological impact of a fishery on populations, not landings. If the percent of <i>catch</i> that is cod is unknown, then there will be real problems giving this fishery a passing score for that criterion.	This comment is considered under 2.1.3
	Para 6, is “Slippage is not a problem in this fishery” because it does not occur rather than because the catches are always small enough to get on board and there is no attempt to high grade etc?	Here, we define the term slippage as the act of discarding fish before sorting, i.e. the catch or the proportion of the catch not brought on board and sorted. We define high-grading as the discarding of catch which is above the minimum landing size in favour of retention of other parts of the catch which will be more valuable at market. High-grading can occur when fisheries operate under restrictive quotas. The assessment team were told verbally that In this fishery all catches are brought on-board and all catch above the minimum landing sizes for which there is quota are brought to market. Text has been modified to clarify.



Reference	Peer reviewers comments	MML and Assessment Team response
	Para. 7, why single out thornback ray and skate and ray spp as requiring monitoring? There are other <b>ETP species</b> such as spurdog that are assessed as being more vulnerable in the North Sea. The detail and discussion of ETP species against <b>2.3</b> in scoring table should be presented here, and then summarised briefly at <b>2.3</b> .	Since interactions with ETP species includes damage e.g. to bivalves, discussion of the ETP listing does not seem to fit neatly under this section which is discussing by-catch and discarding issues. Spurdog have been added to the text as requested.
Biology of the Target Species, <b>para. 5</b>	Are the estimates of 0-group plaice mortality of 6%-18%, obtained from the German shrimp fishery, just fishery-induced mortality (and, if so, why are they included here?), and are they included in the overall 40% per month figure?	The first estimates refer to fishery induced mortality which is not relevant to this particular section and the second to natural mortality only. The text has been amended to reflect this.
<b>1.7.1</b>	<b>Vessels and gear:</b> what mesh size is used in the square mesh panel?	Info on 120mm added– information inserted
	<b>1.7.2 Location of the fishery:</b> what is the relevance to the fishery currently carried out by the UoC of the intensity of beam-trawling (which must chiefly be linked to sole availability) shown in <b>Fig. 2</b> , or the following discussion of mesh sizes used by beam trawlers and discarding of undersized plaice? Particularly given that <b>1.7.3 Landings by twin rig vessels in the UoC</b> shows that sole comprise a negligible proportion of the UoC's landings, presumably on account of the gear rigging and mesh sizes used. It would be useful here to explain that these landings are all into Urk (Netherlands).	This paragraph provides background information on the fishery for plaice as a whole rather than just the fishery by the UoC. It was felt that this was needed to enable the UoC to be seen in the context of the much larger beam trawl fishery. Text has been amended to clarify the position and to emphasise the smaller and more discrete nature of the UoC fishery. The information on landings into Urk is provided under the UoC's code of conduct (section 6.8).
<b>1.15 Harvest controls</b>	Under, you refer to section 6.4 (which does not exist), but otherwise fail to explain what the HCR is, i.e. what would happen if the stock falls below $B_{pa}$ , or F rises above the target F. What rules are used to set the TAC, for example?	Numbering of sections are correct and includes 6.4. Articles from management plan regulation inserted giving HCRs
<b>1.16</b>	note that Osprey Trawlers' Code of Conduct for the UoC is presented at 1.18.	Numbering is correct (not in one PR's version of word)
<b>Fishery Management Framework</b>	There appears to be unnecessary repetition in this section, particularly on scientific advice, TAC setting, quota allocation, technical regulations etc between <b>1.11 Fishing rights, licensing etc</b> (which I suggest is omitted), <b>1.13 Administrative Arrangements and Boundaries</b> and <b>1.1.4 Legislation and Regulation</b> .	Text revised to reduce repetition
<b>5.2.2 (sic) Stock Status</b>	:introduces the concepts of reference points without explaining what these are and how they are derived. It would be useful to present the relevant information from the following text and under <b>1.10 Management advice</b> here, before presenting the assessment of stock status. I think that it is fair to say that there is <u>no</u> relationship between SSB and R, implying that recruitment has been environmentally driven over the time series.	Additional text has been inserted to 5.3 (Management Advice) and reference made to this in 5.2.2.

Reference	Peer reviewers comments	MML and Assessment Team response
	You say that the LTMP for plaice in the North Sea is proving to be successful, with the stock assessed as being at full reproductive capacity and as being harvested sustainably. However, you note that $B_{lim}$ is used as the biomass limit reference point (which it is), whereas $B_{MSY}$ should be a management target (not a limit). This is re-iterated under <b>Condition 1</b> and at <b>1.1.2</b> in the Scoring Table (see later), which requires biomass targets to be consistent with $B_{MSY}$ , but this is not discussed in the relevant sections of the report.	Additional text on the need for biomass targets to be consistent with MSY has been added under section 5.3.
	The section on gear description needs to be augmented in a few minor ways. The section on ecosystem impacts of the fishery has a sound and concise summary of impacts of mobile bottom gears on the sea-floor (page 53 and 54). That part of the report organizes presentation of the conclusions of many studies around the general finding that the size (weight and dimensions) and configuration (angle of deployment, etc) of the doors of the otter trawls are possibly the single major determinant of the seafloor impacts of a particular otter trawls. The term is also used in the relevant scoring comments (page 95+) However, in the section on describing the gear (page 26 and surrounding), I don't see the term "door" ever used (nor can word-search in Word find it). If the term "door" is not conventionally used in describing twin-rigged gears, I would not suggest forcing the term into this text. However the gear description part of the Report has to explain what parts of the gear function like the "doors" as the term is used in the operational parts of the report; and how those parts of the gear compare to "doors" as used on the sections describing and reporting on ecosystem impacts of the fishery.	Text inserted I n4.3.1: Two steel trawl doors size 5m <sup>2</sup> and weighing 1250kg with shoes are used to keep the mouth of the net open. There is regular contact with the trawl doors on the seabed, although vessels attempt to minimise this. Trials are continuing with new door designs on the 4 vessels which are lighter and semi or fully pelagic which are intended to have no contact with the seabed.
<b>Ecosystem characteristics</b>	: this section is comprehensive, but may be too detailed for the non-specialist reader, especially where concepts are introduced without any explanation of their meaning (for example, against <i>Plankton</i> : what is optically complex Case 2 water in the southern region of the North Sea?). Also, under <i>Benthos</i> , why mention that SGNSB recommended a further synoptic survey in the North Sea in 2010, and then say that this will not take place whilst SGCBNS develops its science programme?	The text has been modified to define scientific terms. SGCBNS is a new group which has taken over from SGNSB, which was disbanded. The proposed survey for 2010 is therefore postponed and the text is correct. The purpose of quoting this is to explain to the reader the current status of benthic monitoring for the North Sea. This is relevant to monitoring the effects of the fisheries on North Sea benthos and explains why the data used are around a decade old.
	What is the purpose of mentioning the nominated offshore Natura2000 sites (with no explanation of their purpose or location) in relation to seals? The Natura2000 programme and its objectives should be discussed here, given its prominence in comments in the scoring table.	Text added under 'ecosystem' section to explain the Natura2000 program.

Reference	Peer reviewers comments	MML and Assessment Team response
Discards. Page 28	<p>The data on page 28 report that discards comprise 80% by number and 50% by weight in the total plaice fishery. This is most definitely not the type of fishery the would help the credibility of the MSC, were it perceived that such a fishery were certified. One of the main “selling points” for this assessment has to be that the discard rates in this fishery are so much lower than for most other plaice fisheries. However, on doing so, I would encourage the assessment to distance this particular fishery from the “typical” much more actively that the assessment does at present. It would start by a direct and unambiguous statement right at (or near) page 28 that such a level of wastage in a fishery is <i>not</i> practicing responsible fishing, even if 80% discarding by numbers is “sustainable” (defined narrowly as not causing marked stock decline). Skip the excuses about “regulatory discards”, mixed fisheries, and all the typical excuses fisheries give for larger-than-necessary ecological impact of a fishery. If a fishery is serious about being responsible, it will not operate with an 80% discard rate. Making such a direct criticism may sound judgemental, but a whole MSC assessment is “judgemental”. Then as often as there are opportunities for the rest of the report (and scoring) make sure to point out that the twin-rigged fishery is being considered for certification just because it seems to have found a way to fish place that <i>not</i> nearly so wasteful and irresponsible.</p> <p>Again on discards, figure 4 (pg 30) is interesting but other parts of the story are much more important. Can the cfd of catch be put on the same plot, so we have some sense of the scale of discarded catch relative to retained catch? Also th elabel is misleading. It says “cumulative percentage discarded at length”; but obscures absolute % at length that is discarded. For an evaluation of the ral impact of the fishery, it is necessary to see catch at length integrated with discard rate at length.</p>	<p>The high levels of discards given on page 26 refer to beam trawling and are not representative of the twin rig fleet under certification. The data is provided as background and as a reference for the lower level of discarding by the UoC. A key aspect of the MSC approach is to encourage fishing and management practice that results in the reduction of wasteful discarding and so this is closely in line with your comments. It is also stated explicitly as an Operational Procudeure under Principle 3 of the MSC (see section 9.3 B). It is not thought necessary to restate the MSC principles elsewhere in the report but there are areas in the text where the reduction in discarding by twin rig could be more clearly emphasised and this has been done.</p>

Reference	Peer reviewers comments	MML and Assessment Team response
Page 46	<p>In the section on ecosystems the reporting on the fish community (pg 46) is at quite a different level of detail than the reporting on the benthos. This is not necessarily a problem, but stands out as a definite inconsistency. Either give a fisheries-based rationale for the difference in treatment or else build up the information on the non-commercial fish to match benthos. There are certainly enough studies of fish community structure and trends from analyses of the various survey sources.</p> <p>The other major issue with this fishery (along with discards) is bycatches, particularly of PET species. Table 4 is the key information, but being reported as number per hour, the information is nearly unhelpful because there is no absolute scale to judge the real magnitude of the catch. Those concerned with the actual bycatches will do just what I did – work back through the report to find the number of hours fished by this fleet. Evne that is not reported directly so one has to take catch of plaice per hour (table 3) and total catch per year to estimate the number of hours fished (around 1250 hours per year). This is then used to come up with absolute catches – which are the meaningful units for evaluating the ecosystem impacts due to bycatches. I’m well aware of the potential flaws in such a back-of-the-envelop approach, but with what is presented in the report, it is the only pathway to get to any sort of estimate of actual bycatches. If the preparation of the report would do the job with the greater care needed, then readers (who not as well positioned to do the task correctly as are the assessors) would not have to do the sort of cavalier job I just did. It would also ensure that the appropriate cautions and caveats were included with the estimates; caveats that critics are unlikely to include in their own rougher calculations.</p> <p>Continuing that theme, it is not just getting estimates of actual by-catch, but also allocating that by-catch to particularly vulnerable species that matters most to the certification. There are two obvious groups of bycatches that are most important. One is cod, as a depleted species under a recovery plan. The other is skates and rays – a group of species well documented to be highly vulnerable to mobile bottom-contacting gears, often only able to sustain mortality rates much lower than target species in bottom trawl fisheries, and for many species, severely depressed in abundance in northwest European waters (and elsewhere that trawl fisheries have long histories). On page 54 it references Table 2 as presenting information on bycatches of skates and rays, but data on skates and rays cannot be extracted from table 2. They comprise some unknown part of the “other species”, and that row has to be disaggregated at least to make skates and rays distinguishable. Ideally the report should include a scaling of by-catch of skates and rays relative to population size. This can be done relative to survey-based estimates of N or B for these species, merely treating the survey-based estimate as a minimum (i.e. biomass if <math>q=1.0</math>). The if the absolute biomass estimate is very large relative to the absolute byctch estimate for skates and rays, there is some actual evidence of low impact present to critics of the fishery. These estimates will be uncertainty, but can be presented as “worst case” since B is probably underestimated to the degree that <math>q &lt; 1.0</math>.</p> <p>There are also problems with the story being told about cod by-catch on page 51. It is clear that the fishery is certainly trying to keep cod by-catch low. As I read the report though, they really don’t know what the cod by-catch is. In this case the small amount of directly observed by-catch data on cod in the fishery are from far enough in the past that they may well not represent current bycatches at the current abundance and spatial distribution of cod. Given the conservation and management priority of cod on the North Sea, this lack of knowledge of cod by-catch has to stand as one of the major weaknesses in the assessment. I would expect among the mandatory parts of condition 4 (or 2 and 3) would be a credible and independent estimate of total cod by-catch in the certified fishery (i.e. based on observations from either live observed or validated camera methods that are being adopted in many places), and it must be available by the very FIRST audit.</p> <p>Finally the information on page 53 (last paragraph) comparing the spatial foot-print of the fishery to historical patterns and other fleets: Here is another place where readers are teased with pieces of information but not fully informed of what they want to know. People wanting information on the actual footprint will take data on the gear width and tow duration by speed to get length of the tow. Then they will estimate the meter<sup>2</sup> per hour impacted by beam trawl compared to twin-rig. The assessment should have done these calculations and reported them directly. That way, again, it will be more likely that the necessary caveats are included with the calculations.</p>	<p>Text has been added to expand the description of the typical fish communities found in the North Sea.</p> <p>Condition 2 will generate substantial improvement in the data on total catch and that portion discarded. These data will allow the annual audit team to undertake the calculations suggested by the reviewer. Table 4 does not provide adequate data on catches of PET species to allow this calculation at present. The lack of data on this issue is reflected in the scoring and the condition raised.</p>

Reference	Peer reviewers comments	MML and Assessment Team response
6.3 – last paragraph. (pg 39)	It would be nice to have some sort of statistics on how well this works in practice. It's fine to say "and has done so in past". That's far short of showing that dates of closures match the approach of the OP quota well. This is key to documenting that the scale of management works. It would be even better if there was some evidence that discarding and high-grading did not vary as quota was approached.	Text added: In 2009 vessels in the Lowestoft PO landed 99.5% of their FQA total amount. Just under 20t of plaice quota was unfished and therefore able to be distributed to vessels within the LPO should the need arise, thus avoiding the prospect of discarding marketable plaice due to a lack of quota. No evidence of high-grading in the fishery.
<b>1.1.1 Stock status:</b>	It appears that there is a high degree of certainty that the North Sea plaice stock is above the point where recruitment would be impaired, and a high probability that the stock has been fluctuating around or been above its target reference point over recent years. A mark of around 95 is therefore indicated.	There is a high degree of certainty about the stock status in relation to Blim but the Working Group has a number of caveats about the assessment which imply that there is still some uncertainty about the stock level in relation to Bpa. It clearly merits a mark above 80 and since it only complies with one out of the two SGs at 100, a score of 85 was considered appropriate.
1.1.1	The scoring is fine, but I have a problem with the narrative. Where the text refers to "the target reference level (Bpa)," it may be the case that B <sub>pa</sub> was being used by the management authority as a target, but when ICES estimated the values of B <sub>pa</sub> that were in use during the past decade, their advice most definitely stresses that was a risk control measure for the <i>limit</i> reference point. The advice stressed it was <i>not</i> to be used as a target, but as a lower bound on any possible target. This assessment should respect that distinction, because it is about sustainability and conservation, not just about compliance with a management authority.	This is a valid comment and it is fully accepted that Bpa is a precautionary reference level and not a target. The text has been revised to reflect this. The MSC has since issued further guidance clarifying the need for target reference points to be consistent with MSY. As a result, the Performance Indicators 1.1.1 and 1.1.2 have been updated to ensure that the text and scoring reflect this change in emphasis.

Reference	Peer reviewers comments	MML and Assessment Team response
<b>1.1.2 Reference points</b>	you explain here (but less clearly in the assessment report itself) the basis for the various reference points (with some repetition), noting that $B_{pa}$ and $F_{pa}$ are designed to avoid recruitment failure with a high degree of certainty. However, you suggest that the latter target is well above the $F$ level that is estimated to be necessary to achieve $B_{MSY}$ in the long term, which is required by MSC to meet the requirements for SG80. It is interesting that against <b>1.2.1 Harvest strategy</b> , the long term management plan agreed between the EU and Norway aims for exploitation at $F = 0.3$ with the intention to achieve $B_{MSY}$ and the STECF advises that $F = 0.3$ is necessary to produce the highest yield from the stock of plaice in the North Sea in the long term (see <b>3.2.1 Fishery-specific objectives</b> ), but infer that ICES (presumably) estimates $F_{max}$ of 0.17 would be necessary to achieve $B_{MSY}$ in the long term. This ambiguity is reflected in and further discussed against <b>Condition 1</b> .	There is a discrepancy between the ICES/ACOM advice which implies an $F_{max}$ of 0.17 and the EU and STECF advice for long term management which specifies an $F = 0.3$ to achieve MSY. The value of 0.3 was determined by the ICES <i>ad hoc</i> Group on Long Term Management Advice (AGLTA) (ICES CM 2005/ACFM) and was adopted by the EU in its multi-annual plan for plaice and sole (Council Regulation (EC) No 676/2007). The plan specifies that $F_{0.3}$ is consistent with exploitation of stocks of plaice “on the basis of maximum sustainable yield”. This value should have been used by the assessors rather than $F = 0.17$ . The assessors accept that the target reference point ( $F = 0.3$ ) is set such that the stock is maintained at a level consistent with $B_{msy}$ , it therefore meets the requirements of SG80 under PI 1.1.2. and the previous score of 75 needs to be revised.
1.1.2	The same concern with misinterpreting $B_{pa}$ as a target. ICES was very, very explicit about this. Management is to be risk neutral relative to target RPs – <i>on average</i> at the end of the year the stock should be at a target, such that with perfect management and normal recruitment variation, half the years the stock is below a biomass target and half the years it is above the target. Because in the mid 2000s $B_{pa}$ was a risk control tool relative to $B_{lim}$ to account for uncertainty in assessments and management, it was necessary to be risk averse relative to $B_{pa}$ as well, so with perfect management and normal recruitment variation the stock has low likelihood of falling below $B_{pa}$ . The score of 75 is appropriate for this more correct interpretation of $B_{pa}$ as well. The misinterpretation in the text narrative is more serious here, though. When msy reference points are brought in, there needs to be a lot of thought to exactly how uncertainty and risk are handled in the new framework as well.	The comments under 1.1.1 apply equally here. Text revised to reflect this.
<b>1.2.1</b>	1.2.1 The scoring and text are fine. I note though the statement that “and fishing mortality has been progressively reduced as the SSB dropped towards $B_{pa}$ ” is presented in support of the relatively high score here. I agree with using it as evidence, but call attention to it because it underscores my concern with the misinterpretation of $B_{pa}$ in the narrative of 1.1.1 and 1.1.2. If $B_{pa}$ really were a target, $F$ would not have to be reduced as a stock approached it. So the assessors have the information needed to know that $B_{pa}$ is not supposed to be a target, but seem to want to call it one anyway.	Agreed

Reference	Peer reviewers comments	MML and Assessment Team response
1.2.3	The scoring is a sound reflection of the importance of the poor information on discards. I would have expected a bit more profile on the discard issue in the narrative, however.	The text provides information on discarding by the fishery as a whole as well as by the twin rig vessels. The whole problem of discarding is also widely discussed within the report (4.3.3)
1.2.2 <b>Harvest control rule:</b>	it is unclear whether the HCR has in fact been responsible for the recent reduction in F, or that decommissioning and economic factors unconnected with the HCR for plaice have been the main drivers. A better description of the HCR is required in the body of the report.	It is true that decommissioning and economic factors must have contributed to the reduction in F and recovery of the stock in recent years together with the appropriate harvest control rules. In terms of the assessment and scoring, the harvest control strategy in the form of the long term management plans appear to be appropriate to achieve stock management objectives reflected in the precautionary and limit reference points. The HCR are fully described under section 6.5.
	The retrospective increases in SSB in figure 6 are problematic. I had always taken it as a rule of thumb for good assessment practice that when the numbers of older fish cannot be produced by the numbers of the cohort a year younger and the year before without assuming survivorships greater than one, then one considered the assessment flawed until the problem in the assessment was resolved. How it is “resolved” is very much case species (changes in survey “q” is a common cause, but hardly the only one). What matters is that something as illogical as old fish spontaneously generating when they were not present the year before is not just taken as in “interesting anomaly” and then business proceeds as usual, is if there was a credible reconstruction of population status and trends.	The reason for the retrospective increase in SSB is mainly the result of a change in the weighting of one of the surveys (BTS Tridens survey in the western North Sea) which drives the assessment calibration. This survey observes mainly the older age groups and over the last three years they have become more abundant in this part of the North Sea reflecting a possible change in distribution of older plaice. The WG has recognised this as a source of uncertainty in the assessment and hopes to have a combined survey index for next year.
1.2.3. <b>Information /monitoring</b>	: I find it odd that you consider the absence of reliable discard data to have such a detrimental influence on the North Sea plaice assessment that it warrants a score of 70. Whilst ICES acknowledges some uncertainty as to the stock’s true SSB level (that applies to any assessed stock), the data available from landings and surveys are clearly robust enough to demonstrate that the stock is now well above Bpa, as reflected in a score of 90 against <b>1.2.4 Assessment of stock status.</b>	This is a valid point and compared with many other assessments, the information base for North Sea plaice is very good. Nevertheless, the very high level of discarding is a key driver in the assessment and ICES strongly acknowledges that it continues to lead to uncertainty in the assessment. It is an area where data collection needs to be improved and so a score of 70 is considered to be more appropriate.

Reference	Peer reviewers comments	MML and Assessment Team response
2.1.1	<p>This explanation could be criticised as ingenious and biased in favour of the fishery. Being small cannot be assumed to automatically make a fleet benign. By focusing on catch per vessel relative to TACs for all fleets, the impact of this fishery on all retained species can be presented as small. The concern is that presented as a per-vessel catch relative to a total TAC for a species, with a tiny number of exceptions (the mega-midwater trawlers) the impact of <i>any</i> fishery can be made to look small. If this fishery is going to receive a passing score of 80 the best evidence would be that we could be assured that catches exceed quotas for <i>none</i> of the retained species (and where there are no quotas, some reasonable indicator of sustainability is presented and shown to be met)), and for retained species under recovery plans, the targets in the plans are being met on schedule. If we see that quotas of some retained species are being exceeded or recovery targets are not being met. It would be necessary to show that over the time period when there were concerns about excess catches, this fleet has taken measures to reduce <i>its</i> take of the overharvested species that reduced its catches by at least the rate that overall catches had to be reduced to meet reasonable sustainability measures.</p>	<p>We agree that assessing the impact of a small number of vessels within a larger fishery is an issue. The current MSC approach to this is to encourage certificate sharing and re-assessment of impacts as the number of certified vessels increases. We believe we have followed the MSC guidance in this respect. The UoC has not been prosecuted for exceeding its quotas. Regarding the whole North Sea stock of dab and lemon sole, WGENW (2007) examined catch and survey trends in the absence of formal assessments. Dab total landings from the North Sea were rather stable at around 9000 tonnes (2003-2005). This is well below the precautionary TAC. For lemon sole landing data were only available up to 2004, total landings had fallen to around 500 tonnes. CPUE from the Cefas North Sea survey suggested that abundance of lemon sole had increased steadily over recent years. Comparison of TAC to landings is complicated in that the TAC is joint with witch and with Norwegian waters. Taking account of these comments we have rescored this to 70.</p>
2.1.2	<p>If this criterion is interpreted narrowly as simply requiring an appropriate management strategy to have been adopted by the management authority, and that there is at least some evidence it is working, then I would think it is more than just minimally met. There are strategies for most retained species and key bycatches, and even for the newest ones, the measures in the strategies have been shown to be effective in a variety of similar fisheries.</p>	Re-scored to 85
2.1.3	<p>For this criterion, there is almost no recent and independent data on discards, but discarding being high for at least some species. I would need much better explanations of why, lacking reliable estimates of discards, it can be concluded that “information is sufficient to estimate outcome status” and “sufficient data continue to be collected to detect any increase in risk level”. Once Conditions 3 and 4 are met, I would agree that these benchmarks are met, but I don’t see why one should be confident that they are being exceeded now.</p>	<p>The IMARES discard sampling program does continue to collect data. Condition 2 will ensure that this is strengthened further.</p>



Reference	Peer reviewers comments	MML and Assessment Team response
2.2.3	The case needs to be strengthened for why the assessors consider this fishery to lie about half-way between “Information is <u>adequate</u> to <u>broadly understand</u> outcome status with respect to biologically based limits.” and “Information is sufficient to estimate outcome status with respect to biologically based limits” – and the same for adequacy to support a partial strategy. The “broadly understand” standard may be met, but with the extremely limited (and now several years in the past) information this report says is available on bycatches, one has to struggle to see how one can get very far trying to use the existing information to “estimate outcome status” or “support a partial strategy”. It is certainly hard to see how the fishery is collecting enough information to be close to being able to “detect an increase in risk to main by-catch species”. This narrative needs to be strengthened or reconsidered.	The IMARES discard program is operational but recently collected data were still being analysed at the time of the assessment. The cod recovery plan constitutes a partial strategy for managing cod by-catch in that it relates to the quotas set for North Sea cod. 2.2.3 and 2.3.3 were scored at 70. Some evidence has been presented to the assessment team on discard and by-catch rates. Therefore we believe that the score exceeds slightly the 60 level but the data are not yet adequate to make <u>quantitative</u> estimates as required to score 80. Condition 2 is designed to ensure that discard data quantity is increased substantially.
2.3.1	The lack of information on skates and rays remains a concern here, but given this is about species specifically given protected status by an authority, I think my concerns are more appropriately addressed in 2.2.x, where I go into them in some detail.	Noted
2.3.2	2.3.2 Hard to know what is best to say here. Right now, with the Natura2000 sites so far behind schedule, and the IPOA on skates and rays also way behind the FAO guidance on their development, it is tempting to say the assessment should be much more critical on this criterion. There really is very little <i>in place</i> in terms even of measures, let alone in terms of strategies. However, if these plans / strategies are all completed, implemented, monitored for compliance, and assessed for success, things would be very good on this criterion. How much should a fishery be penalized for a governance process that is slothful? It would certainly increase confidence if it were possible to present a specific date by which EU members have committed to complete implementation of these plans/ strategies, and some evidence that the date was being taken seriously by member States.	We agree with the comments and given the situation the score of 75 given seems appropriate. In terms of dates, the network must be in place by 2012 and member states can then be taken to court for infraction if they fail to do this. There does not seem to be any clear guidance on when monitoring and management plans must be in place but a substantial slippage in this would probably again result in infraction proceedings. NGOs such as WWF are carefully monitoring progress and certainly have the resources to take member states to the European Court if needed.
2.3.3	All my concerns on 2.2.3 apply here at least as much as they do for by-catch overall.	2.3.3 was scored at 70. Some evidence has been presented to the assessment team on discard rates. Therefore the score exceeds slightly the 60 level but the data are not yet adequate to make quantitative estimates as required to score 80. We have re-scored this to 65 to take account of the peer review concerns. Conditions 2 and 3 are designed to ensure that discard data quantity and quality is increased substantially including data on ETP interactions.

Reference	Peer reviewers comments	MML and Assessment Team response
<b>2.4.1 Habitat status:</b>	I am curious as to the reasoning that the experimental semi-pelagic doors will reduce the length of the sweeps (designed to vibrate causing some degree of sediment re-suspension) that is in contact with the seabed. Isn't this counter-productive in terms of catching plaice, given that the chain ticklers are designed to roll over the seabed and encourage the plaice to rise up over the rollers and enter the net, having been herded by the sweeps?	Raising the doors off the seabed will inevitably lift the sweeps to some extent so less of the sweep will contact the seabed. However we agree that the amount is uncertain and that the effect might be minimal. Fishing trials are needed to establish if this would affect catch rates significantly. The text has been modified.
<b>2.4.2</b>	I agree that the strategy described in narrative will deliver the specified conservation outcome once it is in place, and there is an objective basis for it. However, the 80% benchmark has the operative words "in place", and the Natura2000 network most definitely is not "in place" yet. Rather, its development has been dragging out for years. Even if there are targets now for completion of the networks, there have been targets in the past as well, and almost no coastal state has come close to meeting them. This is another of those issues which is completely out of the control of the fishery seeking certification, but it is certainly a barrier to being able to award a score as high as 80% for this criterion. One possibility that would raise my comfort level with this assessment would be a commitment from the fleet seeking certification that they would not fish in any areas that government agencies with the authority to do so have proposed as SACs or otherwise proposed for membership in national networks, during the consultation processes that occur between nomination of sites and finalization of the network. That would fully meet the spirit of this criterion, and not tie the score to a consultation process that has sometimes become very extended. (And the caveat about "government agencies with the authority to do so" is important, because all kinds of groups are making sweeping proposals for coverage of networks of protected areas).	We agree that progress on developing the Natura2000 marine network has been slower than desirable. However, the underlying strategy is in place and there is some evidence that this strategy is being implemented successfully as several sites in the North Sea have now been proposed or designated. The score of 80 seems appropriate at this stage. It is also important to realise that designation of sites does not automatically exclude activities such as fishing. SACs and SPAs are not automatically no-take zones according to the legislation. The fishery does not operate in rocky reef areas as this would damage the gear. Further, condition 4 is designed to allow the audit team to test that fishing is not straying into more sensitive habitats. We have taken the view that on the scientific evidence, impacts on sandy habitats by otter trawling are much less than on muddy habitats.

Reference	Peer reviewers comments	MML and Assessment Team response
2.4.3	<p>2.4.3 Personally I feel the scoring is a little harsh on this criterion. Given the extent of habitat mapping in the North Sea, and the knowledge of where the fleet has fished for its entire history of operations, if this fishery cannot receive an 80% on this criterion, it's hard to imagine <i>any</i> fishery getting a passing score. If the problem is that the highly detailed information in the map shown in Fig 10 is only available for one vessel in one year, and the desire for similar maps for the whole fleet for a longer time, I can see the rationale, but that point is not explicit enough in the scoring comments. (The associated Condition is specific enough, but not the narrative here.) Beyond that, by assigning a score of 75 to this situation, just because it is possible for the VMS tracks to be pulled together for a very fine-scale map of recent effort, it sure sets the bar pretty high for all future fisheries. Outside the North Sea the habitat maps will never be as good, nor can fleet-wide VMS data be assumed to always be available. This standard for 75% is going to lead to failing a lot of other fisheries. It would have been a lot better to have just asked the fleet for these maps as part of the original assessment, had the information when the scoring was done, and moved on.</p>	<p>Yes the data are available but they were not presented to the assessment team in a manner which would allow us to award an 80+ score. As noted the desire is to see all the vessels data over a longer timeframe.</p> <p>Text modified to clarify.</p> <p>With regard to this setting a precedent we do not agree. We are not trying to harmonise across all fisheries subject to MSC but harmonising with regard to similar fisheries operating in a relatively data rich environment, the North Sea. Because we have scored the habitat impacts on the basis of the fishery only operating on sandy and muddy-sand habitats, the data must be presented at audit to prove this and the Condition raised is designed to ensure this happens.</p>
2.5.3	<p>I have two minor concerns with this narrative and score. I agree with everything about the knowledge of the key elements of the ecosystem, which is the bulk of the narrative (and really the major point of this criterion. My first concern comes in with the parts of the scoring guidelines on “Sufficient information is available on the impacts of the fishery on these Components....” Given the lack of information on discards and by-catch that was discussed earlier, it seems a stretch to now claim it is possible to go much further than inferring the main consequences of the fishery. I can see a case being made that the small scale of the fishery and at least general knowledge of the by-catch moves further towards identifying the components and elements impacted, but that case probably needs to be made explicitly. My second concern is with the last part of the criterion, about detecting increases in risk levels, for example due to changes in outcome indicator scores, and developing strategies to manage impacts. As the narrative here says, the North Sea is among the heaviest used marine ecosystems on the planet, and this is a very small fishery. I would expect that even if some of the outcome indicators were to show change, it would be very hard to partition out the degree to which the activities of this fishery contributed to the change, and what, if anything this fishery could do to address the changes. An explicit commitment by the fleet that in the likely circumstance that some “outcome indicator score” (or functional equivalent) did show a change of concern, it would take appropriate conservation measures first, and worry about establishing causality later (i.e. the precautionary approach at work), would be helpful to support such a relatively high score.</p>	<p>The FAM guidance states that ‘in general the Ecosystem Component establishes the performance against which to assess the indirect impacts of fishing on the wider ecosystem, ...’</p> <p>The role of these components in the North Sea is understood and how they contribute to elements such as trophic structure. Given that at the North Sea level we know that bycatch and discarding by the UoC is relatively low compared to the North Sea as a whole, one can infer that the consequences of the fishery on the ecosystem elements, via these components, will also be low. Hence the score exceeds 80.</p>
3.1.4	<p>Perhaps a bit more could be made of the decision to allocate defined fishing rights on a long-term basis, as a positive incentive. The EU States are notorious for <i>not</i> providing the necessary incentives to deal with excess capacity and effort (days of sea is hardly an incentive to reduce effort – only to manage it). The longer-term rights is a step in the right direction and might be highlighted as the feature that – once the perverse incentive in the cod recovery plan is addressed – would lead to passing score on this criterion. Without that provision for longer-term security, it would still be hard to come up with much positive to say about the incentive structure in the EU fisheries.</p>	<p>UK system is of FQAs which stops short of ITRs. The ownership resides with the state which gives permission to fish each year. In practice this operates like ITRs as they are long-term rights, but conditional.</p> <p>Text added as per above</p>

Reference	Peer reviewers comments	MML and Assessment Team response
3.2.2	This is another area where the EU Fisheries Management system is notorious for deferring necessary conservation measures until a crisis has already arrived. I agree with all the points made about the possibility for rapid action under Article 18, should such actions be necessary. However, similar provisions have existed on paper in the past, with little good coming from them. The case for a passing score of 80 would be strengthened if evidence could be cited that Article 18 has been invoked <i>in a timely manner</i> for other fisheries. If the management authority has shown it is finally willing to take rapid action in the face of some uncertainty for other fisheries, it would be more plausible that they would do for plaice as well.	Text inserted: Experience in the North Sea cod fishery indicates that the EC is prepared to adapt plans if required. As Council Regulation No 1342/2008 states in relation to the cod recovery plan implemented under Council Reg. 423/2004: “It appears necessary to reinforce the regime and to introduce a long-term plan in order to achieve sustainable exploitation of cod stocks on the basis of maximum sustainable yield.”
General comments	The Conditions that are specified generally address the problems identified the assessment. In a couple cases, however, I express concerns about the exact why that the conditions are worded. I have no problem with the intent of those Conditions. Rather, base don my experience being part of audit panels, some of the wordings used may make the respective Condition hard to actually close. Some more thought to phrasings that can be evaluated with objective information might save trouble later.	- Conditions redrafted in line with MSC Policy Advisory 17.
Condition 1	Peer Reviewers provided conflicting opinions in relation to reference points and the need for/ intent of a resulting condition. Condition 1: The condition itself is not clear, not is it clear how it could be closed. By saying it is not clear, the text talks about $B_{lim}$ and $B_{msy}$ , and refers to an F target without saying either what it is or what it should be. Right now the primary and “grey” literature in fisheries is filled with papers about what role MSY reference points should play in fisheries; particularly whether they should be targets or limits and whether F or B or both should be control variables in a catch rule. The papers do not agree, and those with agendas can pick and choose answer they want. The Condition should be absolutely explicit about whether the reference points should be for B, for F or for both; should they be MSY based or something else( and if so what); and should they by targets or limits. The other problem is that the condition merely requires that the fishery “must make every effort” to get the management strategy to change. How does an audit panel conclude that “every effort” has actually been made? If MSY reference points are adopted in the way that will be described, fine, but what if they aren’t. Will copies of a bunch of letters and documentation of attending the right consultation meetings be good enough evidence of “every effort”? This is not a petty point. It comes from being on an audit panel which had a similar condition to evaluate, and it turned out there were legal impediments to doing exactly what the condition requested. I have no clever answer here, but, I can imagine a real mess in year 4 if the management authority – which is NOT under the control of the body being assessed – does not adopt MSY based reference levels. Something more testable in needed.	This condition was triggered because it was considered that the target reference point under the EU management plan for plaice ( $F=0.3$ ) was not consistent with maintaining biomass at MSY. The $F_{max}$ level indicated by ICES was given as 0.17. However, the EU target F was derived from detailed analysis by an ICES ad hoc group on Long Term Advice (AGLTA) which concluded that If the objective is to obtain a high long term yield in combination with a low risk to $B_{lim}$ , the preferred level of human consumption fishing mortality could be in the area of $F=0.2$ to $F=0.3$ . Further, the EU management plan states that the exploitation of the stocks of plaice shall be on the basis of maximum sustainable yield. and this objective will be attained while maintaining the fishing mortality on plaice at a rate equal to or no lower than 0,3 on ages two to six years. The assessors have therefore concluded that $F=0.3$ is consistent with MSY and consequently that the conditions under 1.1.1 and 1.1.2 meet the scoring guidelines at 80. As a result it is not necessary to raise a condition. (in agreement with the second PR comment on this issue)
Condition 1	I am not sure that <b>Condition 1 Biological Reference Points</b> is necessary. You suggest that neither $B_{pa}$ nor the long term management target of $F = 0.3$ is in consistent with $B_{MSY}$ . However, the report clearly states that absolute SSB is not well estimated, so a $B_{MSY}$ could be difficult to determine (though the ICES advice table indicates an appropriate value), and that $F= 0.3$ is advised by STECF as producing the highest yield from the stock of plaice in the North Sea in the long term and is the value required under the long-term management plan agreed between the EU and Norway with the intention to achieve $B_{MSY}$ . This conflicts with the value of $F=0.17$ , which appears to come from the ICES advice for high long-term yield, though it is unclear whether this includes discards F (also 0.17). Therefore, the requirements for SG80 do appear to be met, and this condition is not required (and would be out of the Client’s control anyway).	

Reference	Peer reviewers comments	MML and Assessment Team response
Condition 2	Suggest that <b>Condition 2</b> is covered by <b>Condition 3</b> (which includes all discarded species) and can be omitted.	Combined into a single condition
Condition 3	like Condition 3 (and 2 and 4) but it should be not just discards fully broken out by species, but also catches fully broken out by species. We can't get that from existing information (at least the tables in the assessment report).	Revised to result in data on total catch being required.
1.37	Under 1.37 <b>Conditions</b> (note that Pre-conditions are not presently allowed with MSC Certification) you require 6 conditions to be met, mainly by the first surveillance audit (1 year from certification).	Pre-condition text removed
Condition 6:	It is a well-justified condition, but again it has a component that is not under the control of the fishery. It is reasonable and valuable to provide the management authority with the information on the “perverse incentive”, and that can be tested objectives. However the part about the “removal of the negative incentive by the third surveillance audit” again means that certification could be lost if the management authority, for other reasons that may be completely valid, does not change the mesh requirement. I don't know if the rules allow, but if so, it would be helpful to have text attached to the Condition at least allowing that should the management authority not be able to change the perverse incentive, the Condition should be reviewed and adapted as needed to ensure that the same goal (must reduced discards) was being pursued with the same degree of commitment, but that may mean that other pathways than direct removal of the “perverse incentive” could have to be explored.	Revised condition to include requirement of reduced discards in line with UoC2 levels or better should the ‘perverse incentive’ not be removed.

## 17 APPENDIX C

### Client Action Plan

#### Action Plan for meeting the conditions for MSC-certification of the Osprey Trawlers North Sea (ICES IVb) twin rigged plaice fishery.

##### Condition 1. Recording of all catch (retained and discarded)

Data on plaice discards are derived from a limited programme of observer trips on Dutch, Danish, German and UK vessels for 2000-2008. The previous discard monitoring programmes have not included the vessels of the fishery under assessment.

Anecdotal evidence was presented on main by-catch species and the amount of by-catch by the UoC, but limited quantitative data on discards is available.

Therefore at present the requirements for “Stock abundance and fishery removals need to be regularly monitored and have a level of accuracy and coverage consistent with the harvest control rule” (1.2.3) and “information is adequate to support a partial strategy to manage main by-catch species” (2.2.3) are not met.

##### Action required:

Provide a report analysing data on all fishery removals, including stock and discarded species, from sample hauls from UoC vessels operating in the fishery showing:

- i. A level of accuracy and coverage consistent with the harvest control rule.
- ii. Information that is adequate to support a partial strategy to manage main by-catch species.

We recommend this sampling could be undertaken through:

- a. One or more Osprey Trawler Services vessels take part in the IMARES discard sampling and/or observer programmes; or
- b. Undertake self sampling using a protocol consistent with the IMARES discard sampling programme. The species, number and weight of all discards should be recorded in a similar format to the IMARES programme.

Note: A full species list is required – not only retained plaice and cod.

The data set of all discards derived from the above should be compiled with records of all retained species to create a comprehensive data set on total catch for presentation to the audit team. This data set should be analysed, including modelling the impact of cod catches on cod recovery.

**Timescale:** A comprehensive tabulated and analysed data set detailing the species, number and weight of all species caught by the vessels under each UoC (and whether retained or not) must be available at the first surveillance audit.

Analysis should include a simple model showing the impact of UoC total cod catches (retained and discarded) on cod recovery.

Provision of this information is an ongoing requirement and, following review at first audit, will be sought for subsequent audits.

**Relevant Scoring Indicators:** 1.2.3, 2.1.1 & 2.2.3

##### Plan of Osprey Trawlers Services Group for Condition 1.

1.1. In 2010 the vessels of Osprey Group cannot be included in the IMARES discard monitoring programme. Osprey Group therefore will undertake its own discard sampling consistent with the IMARES programme. IMARES has sent the protocols and sample list consistent with the IMARES

discard programme to Osprey Group on 25 March 2010.

1.2. The current IMARES protocol only includes plaice, dab and cod discard monitoring.

Therefore Osprey Group will additionally undertake a self sampling programme for all species caught.

1.3. Osprey Group Skippers will be instructed to sample two fishing hauls (at 4pm each Tuesday and Thursday) during each fishing trip following the IMARES protocol. The number and weight of all discards (in the sample taken) will be recorded on an amended IMARES sample list.

1.4. The skippers and crew of the Osprey Group vessels will be instructed and trained in the use of the amended IMARES sample list. At least one crew member on board of each of the Osprey Group vessels will be trained to identify all species caught to species level. To help with identification each vessel will be provided with species guides on both fish species and bottom fauna. Of each specimen in the catch that cannot be identified to species level a digital photograph will be taken to allow identification by a specialist.

1.5. The skippers and crew of the Osprey Group vessels will be instructed and trained in the identification of Endangered, Threatened and Protected (ETP) species. All interactions with ETP species will be recorded on a special ETP interactions recording sheet.

1.6. The collected data will be sent to IMARES on a monthly basis for analysis. The analysis will include a regular comparison of the data from Osprey vessel with vessels in the IMARES discard sampling programme.

1.7. Osprey Group will contract IMARES (or another recognized scientific institution like ILVO) to conduct two observer trips on board of Osprey Group vessels. During these trips discards of all species (including plaice) will be recorded.

1.8. The scientific institution contracted by Osprey Group will analyze all data collected and present the results annually in a report.

1.9. The analysis by the scientific institution will include a simple model that shows the impact of the UoC total cod catches (retained and discarded) on cod recovery.

1.10. At the first surveillance audit the data and analysis of the first year of recording of discard data will be presented to the assessment team. Following review of this information at the first surveillance audit, the discard recording will be continued and the results will be presented to the assessment team at the subsequent audits.

## **Condition 2. Review of ETP species**

Information is sufficient to qualitatively estimate the fishery related mortality of ETP species. With the recording of all catch and discards required under condition 2, the incidence of ETP species being caught and discarded can be quantified.

At present there is no evidence indicating that ETP species are being significantly impacted by this fishery. A number of strategies are in place under the EU Shark Action Plan or are being developed under Natura 2000 site management plans to manage any potential impact of the fishery on ETP species. To meet requirements, however, there must be “evidence that the strategy is being implemented successfully.

### **Action required:**

Review discard & catch records (produced under condition 2) against list of possible ETP species to enable a sufficiently high degree of confidence in the lack of ETP/fishery interactions.

If any interactions are identified, the effects of these interactions on the population of the ETP species should be evaluated against available population estimates. If significant impacts are identified, then a management plan should be drawn up to reduce the impact of the fishery on the ETP species of concern and continued monitoring put in place to ensure that the approach is working. Evidence of effective remedial action must be presented to the audit teams.

Evidence must be provided that vessels are complying with all EU or national strategies in relation to ETP species, including logbook submissions showing appropriate recording of sharks and ray catches and plots to show compliance with spatial management.

### **Timescale:**

Provision of information by first surveillance audit and ongoing thereafter.

**Relevant Scoring Indicators:** 2.3.3

**Plan of Osprey Trawlers Services Group for Condition 2.**

- 2.1. The skippers and crew of the Osprey Group vessels will be trained in the identification and handling of Endangered, Threatened and Protected (ETP) species.
- 2.2. A protocol for the handling of ETP species will be developed and included in the Code of Conduct.
- 2.3. A manual (list of species and identification tools) will be developed and kept on board of each Osprey Group vessel.
- 2.4. All interactions with ETP species will be recorded on a special ETP interactions recording sheet.
- 2.5. Where significant interactions with an ETP species are identified the management of the Osprey Group will take appropriate actions to reduce or avoid these interactions. Measures will be implemented through the Code of Conduct.
- 2.6. A digital photograph of each unidentified ETP species caught will be taken and stored in a computer file.
- 2.7. At the yearly surveillance audits the records of interactions with ETP species and the management responses will be presented to the assessment team.

**Condition 3. Habitat mapping**

During the audit, the team were presented with VMS track data showing where the UoC fish. Sufficient data are available to allow the nature of the impacts of the fishery on habitat types to be identified and there is reliable information on the spatial extent of interaction.

However, as the impact on certain ETP species such as *Arctica islandica* relates to ground gear interactions with seabed, more detailed information is required to identify the specific seabed habitats being impacted by the UoC.

The fished areas do overlap with proposed marine SAC areas, including Dogger Bank. This activity should be taken into account as the Dutch government develops the Natura2000 management plan for this area. The UoC code of conduct states that it will abide by any spatial restrictions emerging from this management.

**Action required:**

If the vessels participating in this fishery continue to fish in the proposed marine SAC areas they should contribute to the formation of an appropriate management plan by providing detailed information on the spatial and temporal extent of gear interactions in these areas.

To identify any interactions with especially sensitive habitats an overlay map should be produced showing fishing tracks of all vessels in the UoC and the seabed habitat as well as the extent of proposed SACs.

If significant interactions are identified, then a management plan should be drawn up to reduce the impact of the fishery on the sensitive habitats and continued monitoring put in place to ensure that the approach is working. Evidence of effective remedial action must be presented to the audit teams.

The fishery should co-operate with the development of habitat management plans by relevant statutory agencies through the provision of VMS, catch data along with any relevant anecdotal evidence.

**Timescale:** By first surveillance audit and ongoing thereafter.

**Relevant Scoring Indicators:** 2.3.3

**Plan of Osprey Trawlers Services Group for Condition 3.**

- 3.1. Osprey Group will contract a scientific institution or specialist to produce an overlay map with lesser and more sensitive habitats (sediment types), the spatial distribution of the UoC fishing activities (Fishing tracks, GPS and VMS data) and the extend of proposed Natura 2000 SACs, After review during the first surveillance visit an updated overlay map will we be presented to the audit

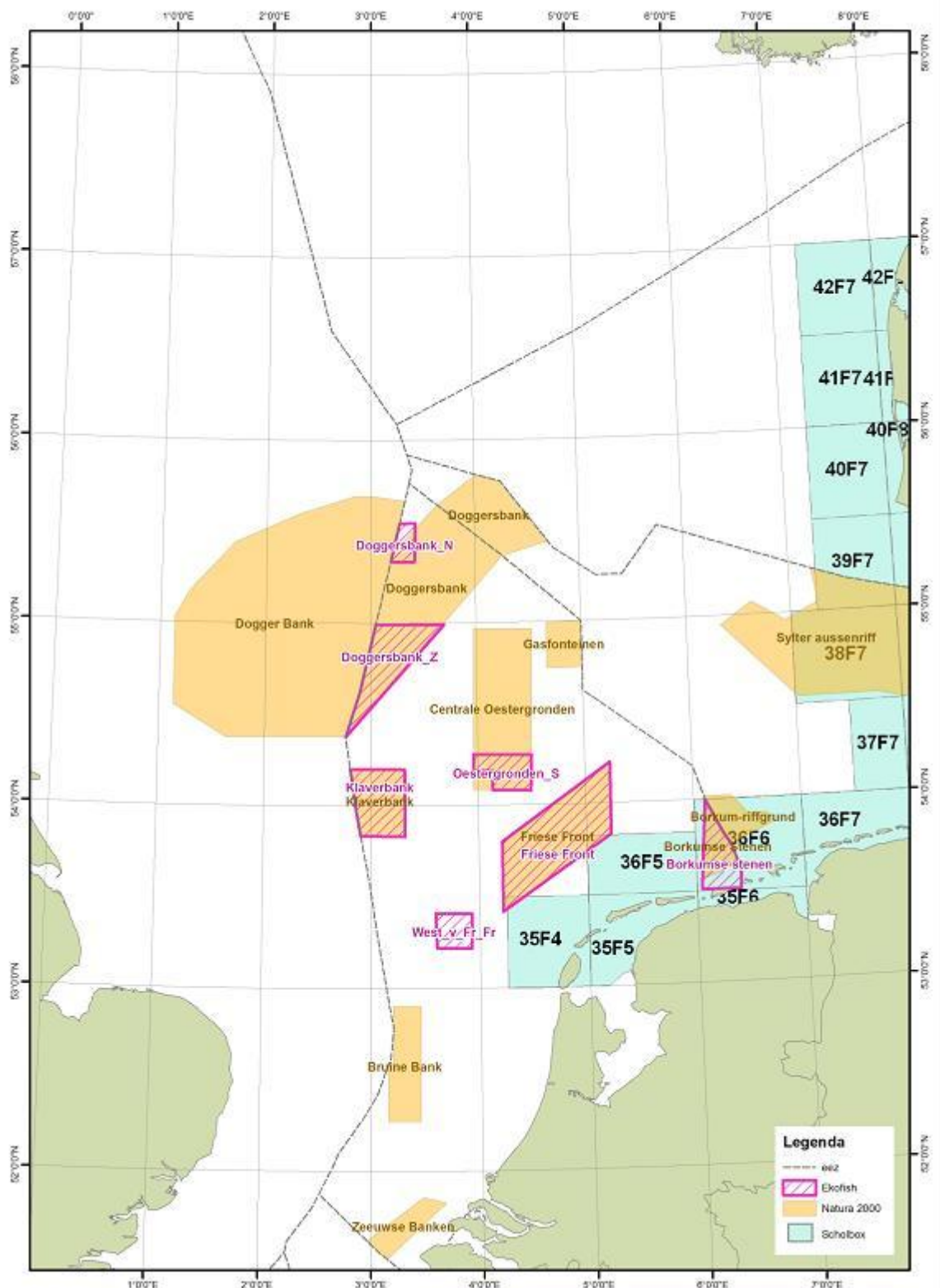


team at subsequent surveillance visits,.

3.2. Until the moment that management plans for the proposed Natura 2000 SACs are implemented Osprey Group will avoid fishing in the areas that are marked on the attached map. (These are the same voluntary closed areas that are currently avoided by the Ekofish North Sea (ICES IVb) twin rigged otter trawl plaice fishery.)

3.3. The overlay map will be updated at a regular basis, When evaluation of the data that are integrated in the overlay map show significant interactions of the UoC fishery with especially sensitive habitats the management of the Osprey Group will take appropriate management action in order to avoid fishing in areas with these habitats. Measures will be implemented through the Code of Conduct and communicated to the audit team at each surveillance vitit.

3.4. Osprey Group will liaise with their fishing industry representatives and government agencies to cooperate with the development of management plans for fishery in Natura 2000 SACs. Osprey Group will provide these fishing industry representatives and other relevant statutory agencies with detailed (VMS/GPS) information of on the spatial and temperal extent of their fishing activities (in proposed Natura 2000 SAC areas).



Map 1. Voluntary closed areas (hatched pink areas) that will be avoided by the Osprey Group (source; Ekofish group certification report).

#### Condition 4. Provision of data to management authorities

A 'perverse incentive' has arisen in overlapping effort management measures under the cod recovery plan and the plaice LTMP. As days at sea are allocated to particular gear sizes, vessels in the UoC are encouraged to fish with a smaller mesh than they would choose to fish with. The result is a greater proportion of discards of target and non-target species than would otherwise be the case.

It is recognised that this situation is the result of an EU-level management regime, which the UoC

must abide by. Effort management measures are revised on an annual basis. The fishery should, however, provide information to the relevant management authorities (including the catch profiling data proposed under conditions 2 and 3) to inform appropriate regulatory revision that removes the negative incentive.

If the negative incentive is not removed by the proposed timescale, an alternative approach is required to deliver the same effect, namely a reduction in discards. This may be through alternative fishing practices such as changes to gear set up, location or timing, if those changes are permitted within the relevant regulations, the UoC and the Code of Conduct.

**Action required:**

Provide evidence that data and information to encourage management revisions was provided to the relevant authorities.

Provide evidence of reduced levels of discarding in UoC 1 (95-110mm cod end) to UoC 2 (>110mm-130mm cod end) levels or better through either removal of the negative incentive (enabling UoC 2 to be operated full time) or through alternative actions.

**Timescale:**

By first surveillance audit: provision of data and information encouraging appropriate management revisions.

By third surveillance audit: evidence of reduced discarding levels across the fishery to levels equivalent with UoC 2 or better.

**Relevant Scoring Indicators: 3.1.4**

**Plan of Osprey Trawlers Services Group for Condition 4.**

4.1. Osprey Group will undertake its own discard sampling monitoring as described in 1.1 – 1.9.

4.2. Osprey Group will have the discard data analyzed by a qualified scientist (see 1.8.).

4.3. The analysis will include an analysis (comparison) of the levels of discarding in UoC 1 (95-110 mm cod end) and UoC 2 (>110mm-130mm cod end).

4.4. The Osprey group will provide the relevant authorities with data and information in order to encourage management revisions) to remove the negative incentive (smaller mesh sizes resulting in more days at sea).

4.5. Osprey Group will provide the audit team with evidence of the actions taken to encourage the relevant authorities to remove the negative incentive at the first surveillance visit.

4.6. In case the negative incentive to use 95-110mm mesh size is not removed before the first surveillance audit the management of Osprey Group will implement alternative measures to reduce discard levels of UoC 1 mesh size to UoC 2 mesh size )or better. These measures can include the avoidance of areas with higher discard percentages and alternative gear set up.

4.7. The Osprey Group will provide the audit team with evidence of the reduction of discard levels in the UoC 1 to UoC 2 levels ) or better at the third surveillance visit,

**Recommendations**

**Recommendation 1: Clarification on reference points**

There is a discrepancy between the ICES/ACOM advice which implies an  $F_{max}$  of 0.17 and the EU and STECF advice for long term management which specifies an  $F=0.3$  to achieve MSY. The value of 0.3 was determined by the ICES *ad hoc* Group on Long Term Management Advice (AGLTA) and was adopted by the EU in its multi-annual plan for plaice and sole (Council Regulation (EC) No 676/2007). The plan specifies that  $F_{0.3}$  is consistent with exploitation of stocks of plaice “on the basis of maximum sustainable yield”. The use of a very low  $F_{max}$  value such as 0.17 would result in an equilibrium stock in excess of 1 million tonnes. This is more than twice the size of the largest stock observed in the historical time series back to 1957. The assessors considered that the  $F_{0.3}$  specified by AGLTA and adopted by the EU was an appropriate candidate for MSY for this review.

The Assessment Team recognizes the detailed consideration given by STECF to inform the long term

management plan establishing  $F=0.3$  to achieve MSY. However the situation is confused at present with additional or alternative reference points reported in annual ICES advice. We appreciate this is outside the control of the UoC. However for the purposes of ongoing management planning and to ensure continued compliance with MSC criteria, we suggest that the client seeks further clarification via its representative bodies, including at North Sea RAC level.

**Plan of Osprey Trawlers Services Group for Recommendation 1.**

5.1. Osprey Group will liaise with its fishing industry representatives and discuss the fact that the current management plan for plaice and sole is using  $F=0,30$  whereas in Ices advice  $F=0.17$  is mentioned as the reference point for reaching MSY.

5.2. Industry representatives will be asked to seek clarification for this discrepancy through North Sea RAC.

5.3. Osprey Group will provide the audit team of evidence of actions taken in this matter at the first surveillance audit.

**18. APPENDIX D**

**STAKEHOLDER COMMENTS**

**& Assessment Team responses**

Number	Comment	Moody Assessment Team response	Change to report
Comments from the Marine Stewardship Council:			
1	Condition 1 wording does not follow the narrative of the performance indicator or scoring guidepost. Additionally, current condition wording is prescriptive. Proposed actions should be removed or rephrased as recommendations.	As the issue relates to information specific to UoC vessels, the following scoring guidepost for 1.2.3 is relevant: Stock abundance and fishery removals are <u>regularly monitored at a level of accuracy and coverage consistent with the harvest control rule</u> , and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule.	Condition 1 text changed to: In order to comply with the scoring guidelines, it is suggested that the UoC provide a report analysing data on all fishery removals, including stock and discarded species, from sample hauls from UoC vessels operating in the fishery showing: i. A level of accuracy and coverage consistent with the harvest control rule. ii. Information that is adequate to support a <u>partial strategy</u> to manage main by-catch species
2	Only one UoC has been established for this fishery, as submitted in the Notification Report. Consequently references to two UoCs in this assessment are not in compliance and any related scoring consequences should be considered.	Two units of certification were identified at the site visit, after submission of the notification report. However, the two UoCs have now been combined with scoring implications for 3.1.4.	All references to two UoCs now changed to a single UoC.
3	A list of stakeholder meetings is included in the report with written stakeholder submissions, but no detailed summary is included regarding any material “issues of concern” that were discussed or the responses of the team.	Section 11.2 presents Stakeholder issues. This includes “Assessment Team comment” on page 76 relating to stakeholder-produced map.	Text added to section 11.2 showing team comment on stakeholder “issues of concern”.
4	Section 13.1 does not describe the system of tracking and tracing of fish and fish products in the fishery (including at sea processing and after landing between landing ports and Urk fish market).	Section 13.1 deals with traceability at sea, 13.2 addresses at sea processing and 13.3 at and following the point of landing.	Additional text added to 13.1: As with all EU vessels over 12m in length, the vessels within the UoC must complete logbooks detailing the date, gear, volume and location (by ICES rectangle) of all catch retained onboard. This information on fishing activity is cross-checked with satellite tracking using a vessel monitoring system (VMS). All catch must be retained onboard prior to landing to a designated port. Dutch fishery officials (LNV) and the UK control agency (MMO) report no compliance issues specific to these vessels and a high level of compliance in this fleet overall. Therefore the risk that catch is misreported is deemed to be low. The UoC vessels only fish within the area identified in the

Number	Comment	Moody Assessment Team response	Change to report
			UoC (ICES sub-area IVb) during the proposed fishing season (01 April to 15 November) and therefore all plaice caught within these spatial and temporal limits would be part of the UoC.
5	Sections 13.1, 13.2 and 13.3 do not describe the known risk factors prior to or after first point of landing.	Text revised to include comment on risk	<p><i>Text added to 13.1:</i> Dutch fishery officials (LNV), the UK control agency (MMO) and the Lowestoft PO report no compliance issues specific to these vessels and a high level of compliance in this fleet overall. Therefore the risk that catch is misreported is deemed to be low.</p> <p><i>Text added to 13.2:</i> As the level of at sea processing is minimal and boxes are open and available for inspection at sea and on land, the potential for additional non-UoC fish entering the system is deemed to be low.</p> <p><i>Text added to 13.3:</i> Dutch fishery officials (LNV) report no compliance issues specific to these vessels and a high level of compliance in this fleet overall. As the fish passes through two auction markets where it is subject to checks by third parties, the risk of unreported fish entering consignments is considered low.</p>
6	Section 13.3 of the report does not include a complete list of ports where landings will be made. According to section 13.4 the scope of certification ends at points of landing. However, section 13.3 states that the certified fish remain the property of the individual vessels until sold on the Urk fish auction which means that the scope of fishery certification includes transportation between port and the Urk fish auction.	<p>Intention is to use Harlingen exclusively but other ports mentioned which could be used in exceptional circumstances.</p> <p>Text altered to indicate fishery certification extends to Urk market and therefore includes transport from point of landing to Urk.</p>	<p><i>Text added to 13.3:</i> Landings will be made primarily at Harlingen and on occasion to other Dutch and Danish designated ports, namely Urk, Cuxhaven and Bremerhaven).</p> <p><i>Text added to 13.4:</i> The scope of this certification ends at Urk market when the fish is sold at auction. Downstream certification of the product would require appropriate certification of storage and handling facilities at this location.</p>
7	PI 1.1.1. (p.88) The rationale does not justify the score. No argument is made for how a Bmsy consistent biomass target has been achieved. This	Text revised and additional text inserted to clarify this issue.	<p>Revised text for P1.1.1: Based on the most recent estimate of SSB (in 2009) and fishing mortality (in 2008), ICES classifies the stock as</p>

Number	Comment	Moody Assessment Team response	Change to report
	fact is indeed contradicted in the rationale for PI 1.1.2, which states: “ <i>when reached, maintaining a fishing mortality at Fmax will ensure that the stock is rebuilt to and maintained at a level consistent with Bmsy...</i> ”		<p>having full reproductive capacity and as being harvested sustainably (ICES 2009). SSB is estimated to have increased from below the precautionary reference level (Bpa) of 230,000t in 2004 to 390,000t in 2009. Although the precise level of the stock is uncertain, it is evident that the stock has increased considerably and this is in line with industry views (North Sea Commission fisher’s survey, 2008). Additional validation of stock status was provided by ICES from a statistical catch at age (SCA) model (ICES WG 2009a). The SCA model estimates similar stock trends compared to the XSA model accepted by ICES and indicates that there is a 95% probability that the SSB is above the precautionary level and there is a high degree of certainty of it being above Blim (the level of impaired recruitment). This meets the requirements of SG100.</p> <p>No biomass target has been identified but there is an implicit target of Bmsy. The SSB is estimated to be at 390,000t in 2009 which is below the Bmsy (&gt;500,000t) and is therefore not yet at a level consistent with Bmsy. It does not meet the SG 80</p> <p>Score: The stock status exceeds the requirements of SG80 on the first scoring issue but not on the second, resulting in a score of 75. This triggers the need to score the stock under P1.1.3 (Stock rebuilding).</p> <p>Revised text for P1.1.2: Although the EU Management Plan is designed to ensure that the exploitation of plaice is on the basis of maximum sustainable yield, the long term target <math>F = 0.3</math> is above the <math>F_{max}</math> (0.17) considered by ICES to be consistent with MSY. The stock is not yet considered to be maintained at a level consistent with Bmsy. Therefore, the SG80 is not met.</p>



Number	Comment	Moody Assessment Team response	Change to report
			<p>Score: Two of the three relevant scoring issues have been met at SG80 or above. A score of 75 is therefore appropriate</p> <p>Additional text for P1.1.3: A building strategy is in place reflected in the EU Multi-annual plan (EC Reg. 676/2007). This meets the requirements of SG80.</p> <p>There is clear evidence from the stock status (see P1.1.1) that stocks are rebuilding towards MSY. Although no time frame is specified, an implicit deadline of 2015 is assumed following adoption by the EU of the World Summit on Sustainable Development in Johannesburg (2002). However, a recent analysis of a range of fish stocks including NS plaice questioned whether this time frame was achievable (Froese &amp; Proelß, 2010) and so it unlikely to meet the requirements of SG 100.</p> <p>Score: The requirements of the first scoring issue are met at SG 80 and whilst a timeframe is specified, there is reasonable doubt over whether it will be achieved in the shortest practicable timeframe and so does not meet the requirement for SG100 but exceeds that at SG80</p>

Number	Comment	Moody Assessment Team response	Change to report
8	<p>PI 2.1.1 This fishery has been established with one UoC and it must be scored accordingly and consistently with rationale provided for how the final score was determined. This applies to all other references to two UoCs throughout the report, e.g. PI 2.1.2, 2.2.1, 2.3.3, etc.</p> <p>The rationale does not justify the score above 60. No evidence is provided that the measures in place are expected to ensure that the fishery <i>does not</i> hinder recovery and rebuilding of the depleted species.</p> <p>The rationale does not justify the score. Further detail needed on how ‘main’ species were determined, and how weight, value or vulnerability of by-catch species was considered and assessed.</p> <p>Text relating to ‘MSC definition’ is incorrect. Additionally rationale is required to justify how the final score was obtained, otherwise the score for this PIS is not justified.</p>	<p>Two units of certification were identified at the site visit, after submission of the notification report. However, the two UoCs have now been combined.</p> <p>For the retained and by-catch species, the definition of main and minor species has been corrected as below.</p> <p>This relates to a mis-interpretation of the wording on page 46 of the FAM where the 5% by weight criteria is given as an example.</p>	<p>All references to two UoCs have been removed.</p> <p>Text modified</p> <p>Text modified</p> <p>Text modified, 5% by weight criteria used but because of their economic value cod and turbot are also treated under ‘main retained’ species.</p>
9 & 11	<p>PI 2.1.2: The rationale does not justify the score of 85 against the scoring issues. See FAM v2 7.1.20 onwards for definitions of partial strategy and strategy.</p>	<p>There is a mix of partial strategies relating to non-quota species and a strategy targeted at cod. There is some evidence that the partial strategies are effective from trends in the IBTS and for cod some evidence that the strategy is achieving its objective. Given this combination we believe the score of 85 is justified</p>	<p>Text modified to clarify</p>
10	<p>PI 2.2.1: The rationale does not justify the score for this PI. Separate scores must be presented and justified for each main species to meet SG80.</p> <p>Additionally rationale is required to justify how the</p>	<p>We have re-examined the available data on benthos by-catch and re-drafted the text for this section.</p>	<p>Text modified</p>

Number	Comment	Moody Assessment Team response	Change to report
	final score was obtained, otherwise the score for this PI is not justified.		
12	<p>PI 2.3.1: Justification required for how ETP species have been determined (e.g rays).</p> <p>Justification for how the second scoring issue is met, specifically provision of evidence on how direct effects are highly unlikely to create unacceptable impacts to ETP species.</p>	<p>Species under ETP come from the OSPAR list, this was stated in the existing text.</p> <p>Direct effects are highly unlikely to create unacceptable impacts to ETP species because of the relatively low catches of these species by the UoC.</p>	<p>Text not modified</p> <p>Text modified</p>
13	<p>PI 2.3.2: The rationale does not justify the score. Further rationale required to justify the 3rd scoring issue of SG80, ie how there is evidence that the strategy is being implemented successfully, especially given that the strategy (ie establishment of closed areas under Natura 2000) has not yet been implemented.</p> <p>This point is also valid for PIs 2.4.2, and 2.5.2.</p>	<p>We have interpreted the guidepost for 80 ‘There is <u>clear evidence</u> that the strategy is being implemented successfully’ as meaning that the strategy (Natura2000) is being implemented , as sites are being nominated and designated at this time. However we acknowledge that the network is not yet fully functional and is more targeted at habitat protection than ETP species specifically so we have not scored this at 80 but at 75. It must also be remembered that although ‘closed areas’ may be implemented as part of the management plan for a Natura2000 site, designation of a site as an SAC does not automatically mean it becomes a ‘closed area’.</p>	Text modified.
14	PI 2.3.3: The rationale does not justify the score of 65. Further detail needed as to what issues beyond SG60 are met, and no evidence is provided on information that is sufficient to qualitatively estimate the fishery related mortality of ETP species.	Agreed	Text added: As some of the ETP species i.e. rays are retained, some quantitative information is available on these species to allow the impact of the fishery to be quantitatively estimated.
<b>Comments from Productschap Vis (Dutch Fish Product Board)</b>			
1	Fisheries in MSC assessment should be aware that they sign voluntarily to avoid protected areas, as defined by NGOs. NGOs are free to make changes in these maps if scientific evidence becomes available and companies will need to avoid the newly defined areas. Accepting this condition will also have consequences for other fisheries in MSC	<p>The map showing voluntary closed areas was produced by the client as part of the Client Action Plan. It was not in response to a condition or recommendation from this Certification Body.</p> <p>The condition set seeks habitat and fishing effort mapping to provide further evidence on habitat and</p>	No change to report

Number	Comment	Moody Assessment Team response	Change to report
	<p>assessment.</p> <p>In case of the Ekofish group, it was recommended by the NGOs to avoid certain areas. This was not a condition. The Osprey Trawlers fish for the same species with similar gears. On what grounds did it become a condition for the Osprey Trawlers rather than a recommendation?</p> <p>Apparently recommendations from the NGOs can lead to new conditions for MSC certification. The certifier allows for policy changes by NGOs which is not in accordance with MSC standards. Further, there is no need for NGOs to define protected areas as these are defined by the European Commission in Natura 2000. Fisheries commit to the guidelines described in Natura 2000.</p>	ETP interactions. It does not seek the creation of closed areas.	
2	The map on p73 is of great concern. There is hardly space for fishing activities in the North Sea waters. The fact that companies dedicate to the MSC certification should be encouraged. The commitment of companies to the additional requirements of NGOs may lead to an undesirable situation in which companies without MSC certificate are allowed in all areas including vulnerable areas while companies that are committed to MSC, with sustainable gears, have to avoid these areas. Further, there is no sound scientific evidence that areas recover when fishing activities are completely banned.	See comment above.	No change to report
3	Page 6: In a self sampling program by different plaice fisheries that started in 2009 in collaboration with IMARES were all species recorded instead of only plaice, dab, and cod. Although the number of vessels fishing with twin-rigged gear in this sampling program is small on research is on-going, preliminary data should be available.	One twin rig vessel using 120mm mesh nets was sampled in June and August 2009. It is understood that only plaice, dab and cod were sampled.	No change to report
4	P13: It is a policy problem that days at sea are	With the MSC comment requiring a single UoC,	Text amended to reflect single UoC as per MSC comment

Number	Comment	Moody Assessment Team response	Change to report
	allocated to particular gear sizes which means that vessels can be encouraged to fish with smaller mesh than they would normally choose. This increases the number of discards.	this unit now includes the smaller meshed nets <100mm result in a score of 75 and triggering a condition.	2 above.
	P33: “1-5-2” should be “1.5-2 m”	Text amended	
	P37: Was Figure 4 published in the mean time? The bars patterns and the legend patterns do not coincide and should be changed in the final version for readability. The text on the x-axis is not entirely correct; “31-36” should be “31-35”.	The figure was revised following comments from the peer reviewers. The figure caption will be amended to ensure that it is clear what the bars refer to.	Text revised: Figure 13 Profile of landings of plaice by EC market size category for vessels in UoC in 2008 (diagonal bars) and 2009 (horizontal bars). <i>Change</i> “31-36” to “31-35”.
	P37: “UoG” should be “UoC”	Text amended	
	P38: Dutch Fish Product Board instead of Dutch Fisheries Product Board (twice).	Text amended	
	P38 Figure 5: In the text above figure 5 it is stated that figure 5 shows the cumulative percentage caught (discards + retained). In text beneath figure 5 it says cumulative percentage discarded.	The text above Figure 5 is correct and the percent discarded will be revised to percent caught.	Text revised
	P39: reference of table in the middle of the page is missing, where does this data come from?	Data is calculated using the equation $L50mm = \text{mesh size (mm)} \times \text{selection factor}$ . The selection factor commonly used for plaice is taken as 2.2 (Wileman, 1992).	No change to report
	P38/39: The term retained is confusing: what does retained mean in table 3? In the original report this column is referred to as discarded. Also refer to page 61 that states: complete catch (minus the retained species).	The heading was incorrect and should have been discarded rather than retained. The correct text will be inserted.	<i>delete “retained” and insert “discarded”</i>
5	P38: the numbers presented in the last paragraph on this page are confusing because two trips were excluded and one number is not correct. On average, twin rigged trawlers with 95mm mesh discarded 49 kg/hr which is 42 % instead of 49%. Is it known how much plaice (kg/hr) is discarded in beam trawl fisheries with mesh size 80mm? The amount of discards for each type of gear (twin rigged and beam trawl) are not really comparable because a different mesh size is used. It seems obvious that gear with a mesh size of 100mm has	Two trips were excluded because they were either targeting Nephrops rather than plaice or were in smaller vessels and their discard rates were considered to be very different to those by the UoC. The discard percentage by 95mm mesh should have been 42% as indicated in Table 3 and the text has been revised. Plaice discards by beam trawlers is given in Grift et (2004; Table 8) as averaging 60kg/hr. The comparison with beam trawls was made in order to show the differences in discard rate even though the gears use the same mesh sizes.	Text amended: Change 49% to 42%

Number	Comment	Moody Assessment Team response	Change to report
	less discards than gear with mesh size 80mm.		
6	P157 Map 1: legend should read “hatched pink areas” instead of “hatched blue areas”.	Client submission now corrected	Now reads “hatched pink areas”
7	<p>I know the data is very recent but ICES-ACOM presented new data on spawning biomass, fishing mortality and the percentage discards of the total plaice catch (<a href="http://www.ices.dk/committe/acom/comwork/report/2010/2010/ple-nsea.pdf">http://www.ices.dk/committe/acom/comwork/report/2010/2010/ple-nsea.pdf</a>).</p> <p>The discussion about the MSY for plaice has not been settled and national policy makers will continue to use the long term management plan (i.e. discussion in Summary in paragraph about weaknesses of fishery management). It is difficult for fisheries to address this issue when there is inconsistency in advice from scientists (i.e. working group WGNSK and ICES-ACOM report).</p>	Although policy makers are currently using the long term management plan (EC Reg. 676/2007), this is not consistent with Bmsy. This has been clarified in the latest report from ICES-ACOM. It is expected that managers will adopt the advice for long term F consistent with MSY	Changes made to PI 1.1.1, 1.1.2 and 1.1.3 to clarify the position.
Comments from Dr. Rainer Froese, IFM-GEOMAR, Germany			
1	<p>I am a fisheries scientist and have estimated MSY, Bmsy and Fmsy for the North Sea plaice stock. This assessment has been peer-reviewed and has been published in a leading fisheries journal. Froese, R. and A. Proelß. 2010. Rebuilding fish stocks no later than 2015: will Europe meet the deadline? Fish and Fisheries 11:194-202. DOI: 10.1111/j.1467-2979.2009.00349.x</p> <p>The certifier did not consider this publication (Froese and Proelß 2010) regarding Bmsy and Fmsy values for Plaice in the North Sea: See particularly supplemental information, with the following values for North Sea plaice: Fmsy = 0.21 (confirmed by recent ICES estimate of Fmsy = 0.2) Bmsy = 1,347,588 tonnes</p> <p>I attach a copy of the publication and of the supporting information, which contains the data for the North Sea Plaice (ple-nsea).</p>	The certifiers attempted to include all relevant publications when assessing the fishery. The paper by Froese and Proelß, which was published in January 2010, is now considered and the reference added to the list of relevant publications.	Text change: Reference added to publications

Number	Comment	Moody Assessment Team response	Change to report
2	The certifier does not provide any evidence for how the current stock biomass is "at or fluctuating around" a biomass consistent with Bmsy, as is required for a score of 80 on this indicator. SSB in 2009 was 380,000 tonnes, i.e., far below Bmsy.	The comments for this performance indicator have been revised following advice from MSC on consistency with MSY targets and the score reduced to 75. Although no explicit biomass target is defined, the score reflects that the stock is not considered to be at a level consistent with Bmsy.	Text revised: see new and amended text under P1.1.1
3	The management plan for this stock has $F=0.3$ as target. Since this $F$ is larger than $F_{msy}$ , the stock is not able to reach Bmsy. We have estimated the time needed to reach Bmsy without(!) fishing as over 5 years. With ongoing fishing, even at $F_{msy}$ , recovery will take much longer than the certification period.	At the time of the current assessment, the EU Management plan specifically stated that the target $F = 0.3$ was consistent with MSY. The certifiers originally worked with this assumption. However, as noted in Froese and Proelß (2010) and stated more clearly by ICES in its latest advice (ICES 2010) an $F 0.2$ will be necessary to be consistent with an MSY framework. The timeframe for achieving MSY is not a straightforward issue. Under an assumption of a Bmsy exceeding 1 million tonnes, then the target of 2015 may not be achievable. However, if the reference point is set as an $F$ target, then it is highly likely that this will be achieved within the appropriate timeframe. It should be noted that biomass targets over 1 million tonnes are more than twice the level seen in the historical record and the impact of these extreme biomasses on such factors as growth and predation will need to be considered as part of the process of the MSY framework. (ICES, 2010. Advice on Plaice in Subarea IV. ICES Advice 2010. Book 6 Section 6.4.7, pp 66-76).	Text change: Performance indicator 1.1.3 now included and revised text included under P1.1.1 and P1.1.2

## **19 APPENDIX E**

### **Registered companies / vessels within Unit of Certification: eligible to sell MSC certified product**

OSPREY TRAWLER SERVICES Limited  
9 WATERSIDE ROAD  
PETERHEAD  
AB42 3EZ

Osprey Trawlers Services Ltd are the certificate holders; only vessels recognised within the group, and abiding by any controls applied to this Unit of Certification, are eligible to land MSC certified fish under this certificate. Any changes in the size of the group will be evaluated during ongoing surveillance audits.

During the fishery assessment the Osprey Trawlers Services Ltd group included the following vessels:

1. E104 Ansgar
2. H357 Good Hope
3. PW447 Louwe Senior
4. H426 Neeltje